

**CBSE
2025**



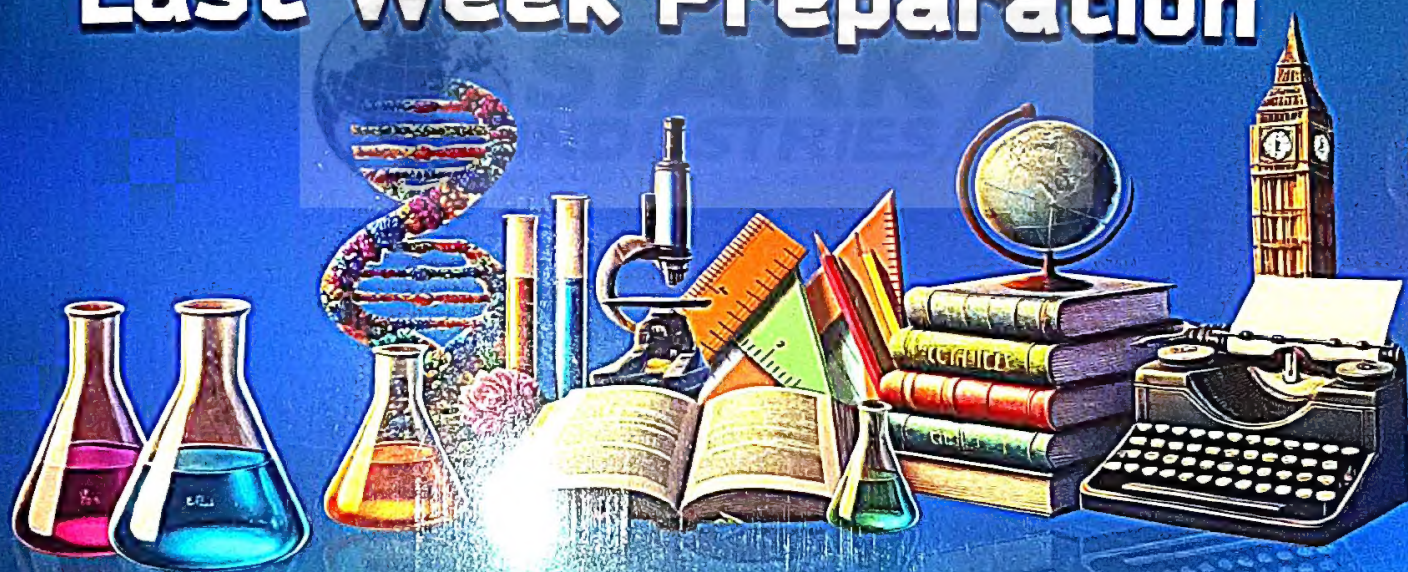
**PHYSICS
WALLAH**

END GAME

for

Class 10

Last Week Preparation



**Science
Mathematics
Social Science
English**



Chapter-wise with PYQs Mapping
CHEAT SHEETS



Analysed Through PYQs with Competency Questions
MOST PROBABLE QNS.



As per Latest Pattern
SAMPLE PAPERS



To Score High
ANSWERING TEMPLATES



To be Exam Ready
OMR FILLING TIPS



To Execute your Paper Properly
TIME MANAGEMENT TIPS



To Avoid Unwanted Errors
DON'T SKIP

2025



PHYSICS
WALLAH

END GAME








for

Class 10

Last Week Preparation



Science
Mathematics
Social Science
English

-  **CHEAT SHEETS**
Condensed Theory with MCQs, Multiple Choice Questions, and Short Answer Questions
-  **MOST PROBABLE QNS**
As per Latest Pattern
-  **SAMPLE PAPERS**
To Score High
-  **ANSWERING TEMPLATES**
To Give Extra Marks
-  **OMR FILLING TIPS**
To Increase your Paper Speed
-  **TIME MANAGEMENT TIPS**
To Avoid Unnecessary Errors
-  **DON'T STOP**



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PREFACE

In this era of cut throat competition among class 10th aspirants for great marks in Board Exams, only a few are prepared enough to achieve it. The key to success lies not just in hard work, but in smart work—knowing what to study, how to study, and how to evaluate oneself before the actual exams. While there is a plethora of study materials available, what often goes missing is a comprehensive, well-structured, and self-assessment tool that aligns with the CBSE curriculum. To bridge this gap, we are pleased to introduce our latest offering: **End Game for CBSE Class 10th Boards for Last Week Preparation**. This book aims to provide students with a robust platform to assess their preparation level, fine-tune their strategies, and ultimately excel in the Class 10th Board Exams.

The content is fully aligned with the latest curriculum, ensuring that you are studying the most relevant material. This makes your preparation more focused and effective. It has been curated by Physics Wallah Editorial Team under the careful observation of Physics Wallah Faculties.

This Book Consists of following Features:

The content is made in such a way that you can invest your time to make a strong fundamental that will get compounded and will pay you the interest in every upcoming year of your competitive exam's preparation and board exam preparation. Such that you will always stand ahead of your competitors.

Following are the different sections that we have provided to develop your skills:

- ❑ Exam Ready: Answering Templates that Score
- ❑ Time Management Tips
- ❑ Don't skip: Avoid Unwanted Errors
- ❑ Instructions for Filling the OMR Sheet
- ❑ Chapter-wise Cheat Sheets with PYQs Mapping
- ❑ Selected Most Probable Questions
- ❑ 4 Sample Papers
- ❑ Detailed Explanations

By using this book as a part of your study plan, you are arming yourself with a powerful tool that will help you secure excellent marks in your Class 10th Board Exams. We wish you all the best in your preparation and are confident that this book will serve as a valuable resource in your journey towards academic excellence.

**Please note 'Cheat Sheet' is just a terminology, we do not promote cheating.*



Answer Writing Strategy

- ❖ Exam Ready: Answering Templates that Score vii
- ❖ Time Management Tips xxiii
- ❖ Don't Skip: Avoid Unwanted Errors... xxx
- ❖ Instructions for filling OMR Sheet...xxxvi

SCIENCE

I. Cheat Sheets

1. Chemical Reactions and Equations 3
2. Acids, Bases and Salts 4-5
3. Metals and Non-metals 6
4. Carbon and its Compounds 7-8
5. Life Processes 9-10
6. Control and Coordination 11-12
7. How do Organisms Reproduce? ... 13-15
8. Heredity 16-17
9. Light - Reflection and Refraction 18
10. The Human Eye and The Colourful World 19
11. Electricity 20
12. Magnetic Effects of Electric Current ... 21
13. Our Environment 22

II. Most Probable Questions

23-44

MATHEMATICS (Standard)

I. Cheat Sheets

1. Real Numbers 47
2. Polynomials 48
3. Pair of Linear Equations in Two Variables 49

CONTENTS

4. Quadratic Equations 50
5. Arithmetic Progressions 51
6. Triangles 52
7. Coordinate Geometry 53
8. Introduction to Trigonometry 54
9. Some Applications of Trigonometry . 55
10. Circles 56
11. Areas Related to Circles 57
12. Surface Areas and Volumes 58
13. Statistics 59
14. Probability 60

II. Most Probable Questions

61-83

SOCIAL SCIENCE

I. Cheat Sheets

HISTORY

1. The Rise of Nationalism in Europe...87-88
2. Nationalism in India 89-91
3. The Making of a Global World 92
4. Print Culture and the Modern World 93-94

POLITICAL SCIENCE

1. Power Sharing 95-96
2. Federalism 97-98
3. Gender, Religion and Caste 99-100

- a. Political Parties 101
- b. Outcomes of Democracy 102

GEOGRAPHY

1. Resources and Development 103
2. Forest and Wildlife Resources 104
3. Water Resources 105
4. Agriculture 106
5. Minerals and Energy Resources 107
6. Manufacturing Industries 108
7. Lifelines of National Economy 109

ECONOMICS

1. Development 110
2. Sectors of the Indian Economy 111
3. Money and Credit 112–113
4. Globalisation and the Indian Economy 114

II. Most Probable Questions

115–140

ENGLISH

I. Cheat Sheets

1. Literature
 - First Flight-Prose 143–145
 - First Flight-Poetry 146–148
 - Footprints without Feet 149–152
2. Reading Skills 153
3. Writing 154–155
4. Grammar 156–160

II. Most Probable Questions

161–174

SAMPLE PAPERS

1. Sample Question Paper (Science) 177–183
2. Sample Question Paper (Mathematics) 184–189
3. Sample Question Paper (Social Science) 190–195
4. Sample Question Paper (English) 196–203

EXAM READY: ANSWERING TEMPLATES THAT SCORE

SCIENCE

Multiple Choice Question Type

Q. The oxide which can react with HCl as well as KOH to give corresponding salt and water is

- (a) CuO
(c) Na₂O

- (b) Al₂O₃
(d) K₂O

Ans.

Question no.: _____

Answer: (Correct Ans Key)

- Evaluate each option systematically by understanding the key terms and concepts involved.
- After identifying the correct option, write only the corresponding correct answer key.
- There is no need to provide the justification or explanation for this.

Comparison Type

Q. How is the movement of leaves of a sensitive plant different from the downward movement of the roots?

Ans.

The table outlining the difference between _____ and _____

| Aspect | Leaves of Sensitive Plant | Downward Movement of Roots |
|------------------|---|----------------------------------|
| Type of Movement | _____ | Geotropism |
| Dependency | _____ | _____ |
| Mechanism | Facilitated by changes in water content within cells. | _____ |
| Trigger | _____ | Environmental stimulus (gravity) |

In comparison / differentiate / distinguishing type questions, start with a general statement introducing the comparison between the two types of movements. This sets the context and keeps the examiner aware of the focus of your answer.

Avoid paragraphs*: Use a tabular format to compare both types of movements.

Use comparative language in pairs to indicate that you're comparing two different things.

Each point should address a different aspect such as **type of movement, dependency, mechanism, and trigger.**

*Use a paragraph format if the comparison-type question awards fewer marks (like 2 marks) or if there are only one or two key differences to mention. You can use the following connecting phrases to make the comparison flow smoothly in a paragraph form: "In contrast", "While", "Unlike", "On the other hand", "Additionally", "However", "Whereas".

Concept Recall-Justification Type

Q. Name the type of chemical reaction in which calcium oxide reacts with water. Justify your answer by giving balanced chemical equation for the chemical reaction.

Ans.

Calcium oxide (CaO), commonly known as _____, reacts vigorously with water. This reaction produces _____.

The balanced chemical equation for this reaction is as follows: _____.

In this reaction, calcium oxide and water combine to form a _____ product. Such a reaction, _____.

_____ reaction.

Introduction: Start by introducing the reactants and products clearly. Ensure to use the correct chemical names and chemical formulae.

Balanced chemical equation: Provide the balanced equation clearly and label each component (reactants and products). Ensure that the equation is balanced in terms of the number of atoms for each element on both sides.

Justification: Clearly identify the type of reaction and provide justification. Use headings and bullet points if needed to organize your answer well.

Analyzing Type

Q. Plants → Deer → Lion

In the given food chain, what will be the impact of removing all the organisms of second trophic level on the first and third trophic level? Will the impact be the same for the organisms of the third trophic level in the above food chain if they were present in a food web? Justify.

Ans.

According to the given food chain,

The first trophic level is represented by: _____

The second trophic level is represented by: _____

The third trophic level is represented by: _____

The impact of removing all the organisms of the second trophic level (_____) would be:

Plants may _____.

Lions would _____.

_____ (Yes/No), If lions were part of a food web instead of a simple chain, the impact

Step-by-Step Analysis: Identify the elements in the question (such as trophic levels in this case) and analyze the relationships between them.

Consider all possible impacts when changes occur (like removing a trophic level).

Justify with Reasoning: Justify your points using logic or scientific principles. If the question asks for comparison (like the impact food chain vs. a food web), explain why one scenario is different from the other.

Conceptual Understanding and Application

Q. Name and state the rule to determine the direction of a:

(i) magnetic field produced around a current carrying straight conductor.

(ii) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it.

Ans. (i) The rule to determine the direction of the magnetic field produced around a current carrying straight conductor is _____.

According to this rule, _____.

(ii) The rule to determine the direction of the force experienced by a current-carrying straight conductor placed in a magnetic field perpendicular to it is _____.

According to this rule, _____.

In subjective questions where answer is of one line or one word, it is better to write the whole sentence.

If question demands explanation or application of any rule then start your answer with "According to _____".

Factual-Function Type

Q. State one role of each of the following in human digestive system:

(i) Hydrochloric acid

(ii) Villi

(iii) Anal Sphincter

(iv) Lipase

Ans.

The role of _____:

(i) Hydrochloric acid: Creates an acidic environment which facilitates the action of the enzyme pepsin.

(ii) Villi: _____.

(iii) Anal sphincter: _____.

(iv) Lipase: _____.

• Begin with an introductory sentence.

• In this case, the question directly asks for functions, so the introduction can be skipped.

• If needed in other such questions, you can write something like this.

Start with the subject (in this case "Hydrochloric acid") and directly state its role (in creating an acidic environment for enzyme action.) Follow this for other components Villi, Anal sphincter, Lipase, and ensure you use bullets/underline for highlighting these components.

Diagram-Creation Type

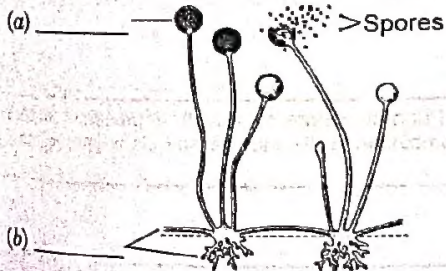
Q. Draw a diagram showing spore formation in *Rhizopus* and label the (a) reproductive and (b) non-reproductive parts. Why does *Rhizopus* not multiply on a dry slice of bread?

Ans.

Rhizopus reproduces through _____.

Start with a brief explanation about the subject (if required).

(a) _____



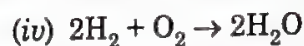
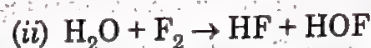
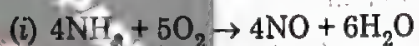
Draw a clear diagram and label all necessary parts as per the question ((a) reproductive and (b) non-reproductive in this case).

Rhizopus does not multiply on dry bread because _____.

If the question asks for reasoning, such as why something happens (e.g., why *Rhizopus* doesn't multiply on dry bread), provide a short and scientifically accurate explanation.

Identification Type

Q. (a) Identify the reducing agent in the following reactions:



(b) Define a redox reaction in terms of gain or loss of oxygen.

Ans.

(a)

(i) Reducing agent: _____.

This is because it is getting _____.

(ii) Reducing agent: _____.

This is because it is getting _____.

(iii) Reducing agent: _____.

This is because it is getting _____.

(iv) Reducing agent: _____.

This is because it is getting _____.

(b)

In a redox reaction, _____ occur simultaneously.

- _____: The process of gaining oxygen.
- _____: The process of losing oxygen

• **Identifying specific roles in reactions:** Carefully analyze the given reactions and determine the specific roles asked (e.g., identifying the reducing agent in this case).

• **Justification:** Provide concise reasoning for your identification, linking it to key concepts (such as, linking reducing agent to oxidation i.e., loss of electrons or gain of oxygen in this case).

Key concept explanation: Begin by briefly explaining the key concept or process relevant to the question. (e.g., explaining redox reaction as, where oxidation and reduction occur simultaneously, involving the gain or loss of oxygen).

Cross-Based

Q. In a cross with two pairs of contrasting characters

RRYY × rryy

(Round Yellow) (Wrinkled Green)

Mendel observed 4 types of combinations in F_2 generation. By which method did he obtain F_2 generation?

Write the ratio of the parental combinations obtained and what conclusions were drawn from this experiment?

Ans.

_____ was performed between two pairs of contrasting characters (RRYY × rryy).

Mendel used _____ of F_1 plants to obtain the F_2 generation.

| | RY | Ry | rY | ry |
|----|------|------|------|------|
| RY | RRYY | | RrYy | |
| Ry | | RRyy | | Rryy |
| rY | RrYY | | | |
| ry | | Rryy | rrYy | rryy |

The ratio of parental combinations is _____.

Conclusion: This experiment explains the Mendel's Law of _____, where _____.

• **Introduction:** Begin by identifying the type of cross performed.

• Specify the method used (Self pollination in this case).

Diagram: Draw a Punnett square to visually represent the cross and the resulting combinations (Phenotype and Genotype) in the F_2 generation.

• **Observation:** State the phenotypic/genotypic ratio of the observed combinations (Parental in this case) in the F_2 generation.

• **Conclusion:** Summarize the conclusion drawn, focusing on Mendel's laws (Law of Independent Assortment in this case).



Visual Watermark

Analytical and Observation Type

Q. (i) While electrolysing water before passing the current some drops of an acid are added. Why? Name the gases liberated at cathode and anode. Write the relationship between the volume of gas collected at anode and the volume of gas collected at cathode.

(ii) What is observed when silver chloride is exposed to sunlight? Give the type of reaction involved.

Ans.

(i) To make water _____ before electrolysis, acid is added to the solution. This makes it _____.

• Gases Liberated:

At cathode: _____

At anode: _____

• Volume Relationship: The cathode gas collection volume is _____ the anode gas collection volume.

The chemical equation is: _____

(ii) When silver chloride (AgCl) is exposed to sunlight, it produces _____ and _____. This occurs because _____ upon exposure to light.

Type of reaction: The reaction is known as _____.

Explaining the purpose: Start with a clear statement about the purpose or key factor involved in the process (e.g., increasing conductivity in this case).

Observations

• Gases liberated: Clearly specify the gases produced at cathode and anode respectively.

• Describe relationship: Describe the relationship or comparison if applicable, emphasizing key points or differences.

Balanced chemical equation: Support your answer with a balanced chemical equation to illustrate the stoichiometry.

Key observation: State the change that occurs and provide the name of the type of reaction.

Definition-Sequence Type

Q. Define reflex action. With the help of a flow chart show the path of a reflex action such as sneezing

Ans.

For questions with two or more parts, starting the second part with a new paragraph is a great approach.

Reflex action is a _____

Reflex action path of sneezing:

Detect Irritants in the Nose → _____

_____ → Signal Reaches Spinal

Cord → _____

→ Expel Irritant Through Sneezing

Start the answer by using define part (in this case "Reflex action") of the question and connecting phrases like "is" or "can be defined as" to provide the definition in simple and precise way.

• Start the flow chart by mentioning the sensory part initiating the reflex action (detection of irritants in the nose).

• Use "followed by" or "leads to" (you can indicate this by arrows(→) to show the direction or flow of each step) in-between paths/components and ends with the action (expel irritant by sneezing).

Numerical Type

Q. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position of the image formed by the mirror.

Ans.

Given that: _____

To find: _____

Using mirror formula,

$v =$ _____

Thus, the image will be format at _____ from the mirror.

Start the answer by writing the given data and identifying what needs to be found.

Mention the formula used in the question.

Writing the final concluding line will reward you format marks.

Experimental Type

- Q. A knife which is used to cut a fruit was immediately dipped into water containing drops of blue litmus solution. If the colour of the solution is changed to red, what inference can be drawn about the nature of the fruit and why?

Ans.

Litmus solution is an _____ used to determine whether a _____.

For acidic solutions, the colour of litmus changes from _____.

According to the observation in the question, the colour of the litmus solution changes to red when the knife is dipped in it after cutting the fruit.

Therefore, it can be inferred that the nature of the fruit is _____.

Define key term: Start with a brief explanation of any key term or concept mentioned in the question (in this case, explain about litmus and its use as an indicator).

Clearly state observation: Describe any change or observation related to the question (in this case, describe the colour change observed in litmus solution).

Inference: Based on the observation, clearly state what can be inferred from the change.

Case-Based

(Data Based/Diagram Based/Conceptual)

- Q. Study the data given below showing the focal length of three concave mirrors A, B and C and the respective distances of objects placed in front of the mirrors:

| Case | Mirror | Focal Length (cm) | Object Distance (cm) |
|------|--------|-------------------|----------------------|
| 1 | A | 20 | 45 |
| 2 | B | 15 | 30 |
| 3 | C | 30 | 20 |

- (i) In which one of the above cases the mirror will form a diminished image of the object? Justify your answer.
 (ii) List two properties of the image formed in case 2.
 (iii) (A) What is the nature and size of the image formed by mirror C? Draw ray diagram to justify your answer.

Or

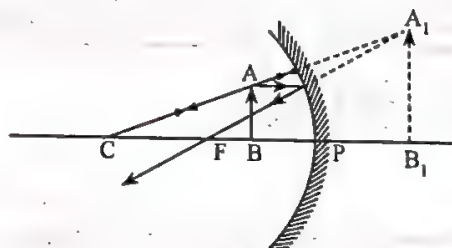
- (iii) (B) An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case.

Ans.

- (i) In case (1), the mirror will form a _____ because _____.

- (ii) In Case (2), the object is located at _____ indicating that the image formed will be _____. So the image will be _____.

(iii)



Nature of the image is _____.

If subpart is of 1 mark only then writing the answer in one word is sufficient. Here reason is also asked so mention that reason. don't need to explain.

In such type of questions where application/concept of something which is unknown is asked then firstly you need to mention that then write the answer (application) which has been asked like in this question you need to find image position first.

Questions where diagram and properties are asked it is advisable to draw the diagram first and then write the properties.

MATHEMATICS

Proving (Equation Based) Type

Q. If $\cos \theta + \sin \theta = 1$, when prove that $\cos \theta - \sin \theta = \pm 1$

Ans.

Given: It is given that $\cos \theta + \sin \theta = 1$.

To prove: _____

Explanation: Start by squaring both sides of the given equation $\cos \theta + \sin \theta = 1$.

Conclusion: Hence, $\cos \theta - \sin \theta =$ _____

Proving (Theorem/Concept Based) Type

Q. Prove that $\sqrt{3}$ is an irrational number.

Ans.

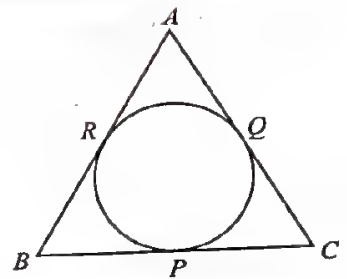
To prove: _____

Explanation: Assume that $\sqrt{3}$ is _____ and can be written as _____

Conclusion: Hence, $\sqrt{3}$ is _____

Q. Prove that the lengths of tangents drawn from an external point to a circle are equal.

Using above result, find the length BC of $\triangle ABC$. Given that, a circle is inscribed in $\triangle ABC$ touching the sides AB , BC and CA at R , P and Q respectively and $AB = 10$ cm, $AQ = 7$ cm, $CQ = 5$ cm.



Ans.

Given: $AB =$ _____ cm, $AQ =$ _____ cm, $CQ =$ _____ cm.

To find: _____

Explanation: Start by using the property that the lengths of tangents drawn from an _____ to a circle are _____

Conclusion: Hence, the length of BC is _____

Evaluation Type

- Q. The minute hand of a wall clock is 18 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.

Ans.

Given: Length of the minute hand = 18 cm, Time interval = 35 minutes

To find: _____

Construct the diagram: First, we will draw the circle representing the clock face.

Explanation: Indicate the position of the minute hand at the start and after 35 minutes.

Conclusion: The area described by the minute hand is _____ cm^2 .

- Q. A boy whose eye level is 1.35 m from the ground, spots a balloon moving with the wind in a horizontal line at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at an instant is 60° . After 12 seconds, the angle of elevation reduces to 30° . If the speed of the wind is 3 m/s then find the height of the balloon from the ground. (Use $\sqrt{3} = 1.73$)

Ans.

Given: Eye level height: 1.35 m, Speed of the wind: 3 m/s, Initial angle of elevation = 60° & Final angle of elevation = 30°

To find: _____

Construct the diagram: First, we will draw the positions of the boy's eye level and the balloon. Mark the angles of elevation.

Explanation: Now, we will apply the trigonometric ratios

Conclusion: The height of the balloon from the ground is _____ m.

Case-Based

- Q. Ms. Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer.

On the basis of the above situation answer the following questions.

(i) Write an A.P whose terms represent the number of jars in different layers starting from top. Also, find the common difference. 1

(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer. 1

(iii) (a) If there are 'n' number of rows in a layer then find the expression for finding the total number of jars in terms of n. Hence find S_8 . 2

OR

(iii) (b) The shopkeeper added 3 jars in each layer. How many jars are there in the 5 th layer from the top? 2

(i) Given: The number of jars in each layer forms a pattern: _____

To find: _____

Explanation: Start with the first term as _____, and notice that each successive term increases by a fixed number.

Conclusion: The A.P. is _____ and the common difference is _____.

(ii) Given: The number of jars in each layer increases following an arithmetic progression.

To find: _____

Explanation: Assume the total number of jars in the n-th layer can be calculated using the general term of the A.P.

Conclusion: Therefore, it is _____

(iii) (a) Given: The arithmetic progression _____ and its common difference _____

To find: _____

Explanation: Use the formula for the sum of an arithmetic progression.

Conclusion: Therefore, the total number number of jars is _____

OR

(b) Given: An additional 3 jars are added to each layer.

To find: _____

Explanation: Calculate the number of jars in the 5th layer using the given pattern.

Conclusion: Therefore, the number of jars in the 5th layer is _____

SOCIAL SCIENCE

Conceptual-Justification Type

Q. Why is the horizontal distribution of power-sharing important? Explain

Ans.

The Horizontal distribution of power-sharing is important for the following reasons:

(i) Reason 1 _____

(ii) Reason 2 _____

Begin with an introductory sentence. For example, you may start by defining Horizontal power distribution. In this case, the question directly asks for reasons so the introduction can be skipped.

Now, proceed with the reasons/measures/functions/characteristics/examples, etc. as may be asked in the question.

Evaluating-Analyzing Type

Q. "The role of women is gradually enhancing in the politics of the country." Examine the statement.

Ans.

The statement "The role of women is gradually enhancing in the politics of the country is _____. (True/Not true)

It stands true because _____

In the questions, which include examining, analyzing, and evaluating the statement, first verify its accuracy if the statement is true or false.

Provide reasons, or examples in support of your stance. Also, mention the positive and negative impact if this is worth more than 2 marks.

Comparison Type

Q. Differentiate between organized and unorganized sectors.

Ans.

Following are the differences between the _____ and _____:

| Basis | Organized Sector | Unorganized Sector |
|-----------|------------------|--------------------|
| (a) _____ | _____ | _____ |
| (b) _____ | _____ | _____ |

In comparison / differentiate / distinguish / type questions, start with a general statement introducing the comparison between the two concept or topic given. This sets the context and keeps the examiner aware of the focus of your answer.

- **Avoid paragraphs:** Use a tabular format to compare.
- **Comparative Phrases:** Include terms such as in contrast, whereas, while, etc., to show the differences clearly.

Each point should address a different aspects such as Definition, Term of Employment, Job Security, etc.

Conceptual-Understanding Type

Q. "Democratic systems are based on political equality." Explain the statement.

Ans.

The statement "Democratic systems are based on political equality" highlights the _____

Practical examples: _____

Conclusion: _____

Begin by explaining the meaning/fundamental principle of political equality in a democracy. For example, the concept of political equality in democratic systems emphasizes that all individuals have equal rights and influence in decision-making.

Elaborate on how political equality operates practically by focusing on **Voting Rights, Equal opportunity of Participation, and Equal Value of Every Vote.**

Conclude by emphasizing how political equality promotes inclusiveness and fairness within the political system.

Identification-Application

Q. "Mohan recently bought a farm and wants to grow crops such as sugarcane, cotton, and jowar. He is unfamiliar with the local soil types and climatic conditions." Help him identify the appropriate soil type and its properties for successful farming.

Ans.

For growing crops like sugarcane, cotton, and jowar, _____ soil is the most suitable due to its unique properties and availability in specific regions.

Soil's Characteristics: _____

It contains _____, carbonate, magnesium, _____. Its nutrient richness and water-holding capacity support the growth of crops like cotton, sugarcane, and jowar effectively.

Climatic Adaptability: _____

Thus, _____ is ideal for crops like sugarcane, cotton, and jowar due to its nutrient-rich composition, moisture retention, and adaptability to climatic conditions."

Start with a brief introduction, explaining the relevance of **choosing the right soil** for specific crops.

Explain Soil's Characteristics for example: formed from lava flows, covers Maharashtra, Saurashtra, Malwa, and extends along the Godavari and Krishna valleys. It is clay-rich, ensuring excellent moisture retention, and is ideal for crops.

Mention the nutrients it carries and its benefits for agricultural productivity.

Develops **deep cracks** during dry seasons, aiding **aeration**, becomes **sticky when wet**, making it difficult to manage in the rainy season but ideal for pre-monsoon plantation.

Sum up the answer by linking soil's properties with crop suitability.

Map Based Question

Q. (a) Two places A and B have been marked on the given outline map of India. Identify them and write their correct names on the lines drawn near them.

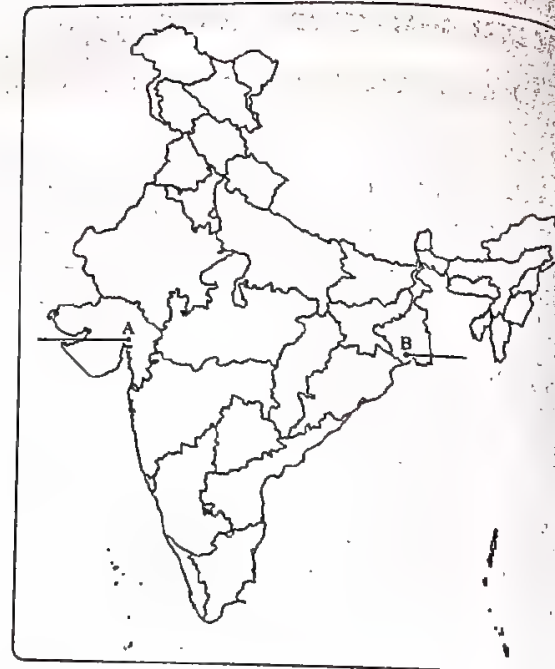
A. The place where the Peasant Satyagraha took place.

B. Indian National Congress session was held at this place in Sept. 1920.

(b) On the same outline map of India locate and label any three of the following with suitable symbols

- A Software Technology Park in Maharashtra.
- A coal mine in Jharkhand.
- The tallest dam in India.
- A seaport located in West Bengal.

Ans.



Right name and roll number on your Map

Name: _____

Roll No: _____

• In part b, locate and label only three of the four given, as marking all four won't give extra marks.

• Ensure all locations are labeled clearly without overcrowding the map to ensure the examiner can easily read your answer.

• Do not attach the map to the front and back of your answer booklet; instead, tie it in the middle to reduce the risk of tearing and misplacement.

KHEDA

A

b(i)

b(iii)

B

CALCUTTA

b(ii)

Use lines or arrows if the label does not fit next to the marked point.

Use of different Symbols like shaded triangles or squares for Part - b.

ENGLISH

Direct Comprehension Question

Q. The writer mentions 'sustainable farming practices' in paragraph 4. Which of the following is a sustainable farming practice?

Select the correct answer:

- A) Using chemical fertilizers and pesticides extensively to increase crop yields
- B) Clearing large areas of natural vegetation to expand farmland for organic farming.
- C) Implementing crop rotation and using organic compost to maintain soil health.
- D) Relying solely on monoculture farming to maximize production efficiency.

Ans.

C) Implementing crop rotation and using organic compost to maintain soil health.

In questions involving evaluating practices, consider the environmental impact and longevity carefully.

Inference Question

Q. In paragraph 1, what does the phrase 'each person's effort towards conserving water can significantly impact the preservation of this vital resource' emphasize?

Ans.

The phrase emphasizes that:

Identify the key message of the phrase.

It suggests that because:

Explain why this message is important.

Vocabulary and Reference Question

Q. Identify the word that indicates that the writer anticipated a higher percentage of sponsored initiative murals.

Ans.

The word is:

Find the word that shows the writer's expectation for more sponsored murals.

Analytical Question

Q. List any two points that a powerful message sent to businesses and policymakers about the importance of water conservation might include.

Ans.

The two points are listed below

Point:

Write one key point about water conservation

Point:

Write another relevant point.

Reported Speech Question

Q. Rhea asked the following question to her colleague, Deepak. "Have you finalized the magazine content to be submitted tomorrow?" Report Rhea's question correctly.

Ans.

Reported Speech:

Convert the direct speech into indirect speech using appropriate changes in tense and pronouns.

Example: "Rhea asked Deepak if he had finalized the magazine content to be submitted the next day."

Extract-Based Question

Q. What effect does the experience, as described in the lines below, have on the baby seagull?

Ans.

Effect of the experience:

Choose the most suitable option based on the emotions conveyed in the lines. Consider keywords like "terror" or "scream" to understand the impact.

General Language Usage Question

Q. Fill in the blank by choosing the correct option to complete an official announcement.

"Attention all prefects, please be informed that the deadline for submitting your registrations for participation in the Art Exhibition has been extended; (that/these/this) should be communicated to all students of classes IX-X."

Ans.

Select Option:

Choose the correct demonstrative pronoun that fits the context.

Example: "this"

Letter Writing

Q. You are Chhavi Pathak of Ranchi, Bihar. Write a letter in about 120 words addressing the Secretary of the City Municipal Authority. Detail the problem of overgrown trees and shrubs in the neighbourhood and request the delegation of personnel for regular pruning.

Ans.

Sender's Address and date:

Receiver's Designation and Address:

Subject: _____

Salutation: _____

Body of the Letter:

Introduction: _____

Explanation: _____

Request for Action: _____

Complimentary Close: _____

Signature and Name: _____

Write your address and date in the correct format.

Include designation and address.

Write a brief subject line.

Use a respectful greeting.

Cover the key points in the body.

State the problem briefly

Describe the issue and its impact.

Ask for a specific action.

Use a polite closing phrase.

Write your name.

Analytical Paragraph

Q. Read the product details on a label for a school bag:

ECO-FRIENDLY SCHOOL BAG

1. Made from recycled materials
2. Ergonomic* design with padded shoulder straps and breathable mesh back panel
3. Spacious main compartment with multiple pockets and organisers
4. Reflective strips for visibility and safety
5. Water-resistant fabric
6. Available in various vibrant colours and patterns

Now, analyse why this school bag would be a beneficial purchase. Write the analytical paragraph in 120 words, considering factors such as its eco-friendliness, comfort features, functionality, safety aspects, and design options.

* Design that is intended to maximise comfort, efficiency, and safety for the user.

Introduction:

Key Features:

Conclusion:

Introduce the product and its purpose.

The Eco-friendly School Bag is designed for students' comfort and sustainability.

Mention important features

- Talk about eco-friendly material.
- Mention comfort (e.g., padded straps)
- Include safety aspects (e.g., reflective strips)

Summarize the benefits.

This bag is durable and safe, making it a great choice.

Theme and Character Analysis

Q. How does the ignorance about Mijbil as a creature in the urban environment of London reveal insights about people's perceptions and knowledge regarding animals?

Ans.

Introduction:

Explanation of Insight:

Conclusion:

Start by briefly introducing the context of the story or poem. Mention Mijbil and the city setting.

Describe the key insights revealed about people's perceptions or attitudes. Use examples from the story to support your answer.

Summarize the takeaway about human perceptions or behaviors towards animals. Keep it brief.

Creative Writing Question

Q. Imagine that M. Loisel, from *The Necklace* by Guy de Maupassant, writes a diary entry, exploring the theme of class and social status and the nature of social mobility in the context of his own experience. Write the diary entry as M. Loisel, in about 120 words.

Ans.

Date:

Opening Line:

Main Body:

Closing Line:

Signature:

Write the current or relevant date for the diary entry.
Example: 15th March, 1880"

Begin with a reflective statement or feeling.
Example: "Today, I cannot stop thinking about the consequences of our decisions."

Write about M. Loisel's thoughts on class, social status, and the impact of losing the necklace. Include reflections on his struggles, emotions, and realizations.
Focus on M. Loisel's experience and his understanding of social mobility.
Discuss the sacrifices made and their consequences.

End with a concluding thought or hope.
Example: "I wonder if all this would have been different had we made better choices."

Sign off as M. Loisel.

TIME MANAGEMENT TIPS

1. Fill the OMR Sheet in the Assigned Time Only

Make sure to fill the OMR sheet accurately within the assigned time to avoid wasting valuable time meant for writing answers. This will save time, reduce stress, and help you stay focused during the exam. Refer OMR Filling instructions to avoid any kind of mistake in the exam.

2. Save Time with Early Preparation

In subjects like Maths, where rough work is essential, use the time given to fill the OMR sheet to quickly draw margins for rough work using a ruler. This small step helps you stay organized and ensures you can focus completely on solving questions without wasting time later.

Reference:

| Section-A | | Rough |
|---|--|--|
| 1. (C) 2, 2, 4 | | $\begin{array}{l} \text{Zn} \\ \text{Zn(NO}_3)_2 \rightarrow \\ \text{ZnO} + 4\text{NO}_2 \\ + \text{O}_2 \end{array}$ |
| 2. (D) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ | | 2, 2, 4 |
| 3. (A) calcium phosphate | | |

3. Use the Exam Reading Time Wisely

You get a good 15 minutes in the beginning to read the question paper. At the start, carefully read all the questions. Understand the paper pattern and identify the questions that seem easier or quicker to attempt and the questions that are tricky and require more time.

Reference:

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

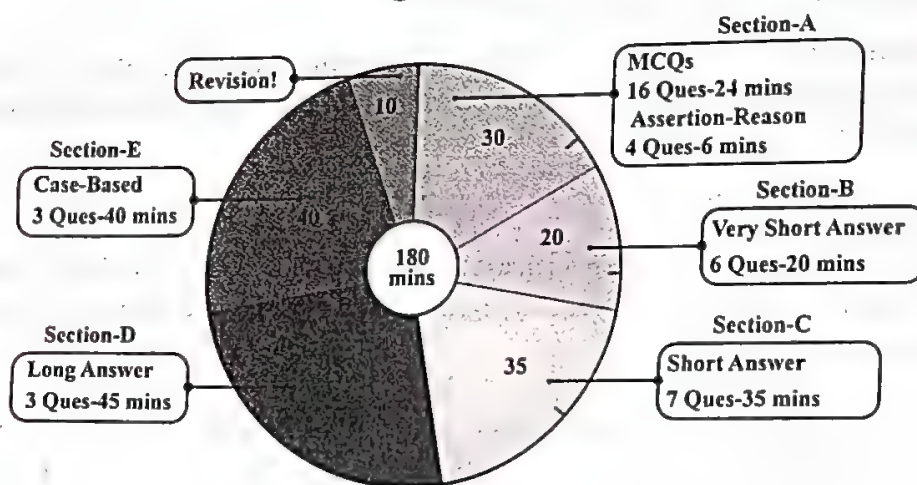
(V) 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

4. Allocate Time for Each Section

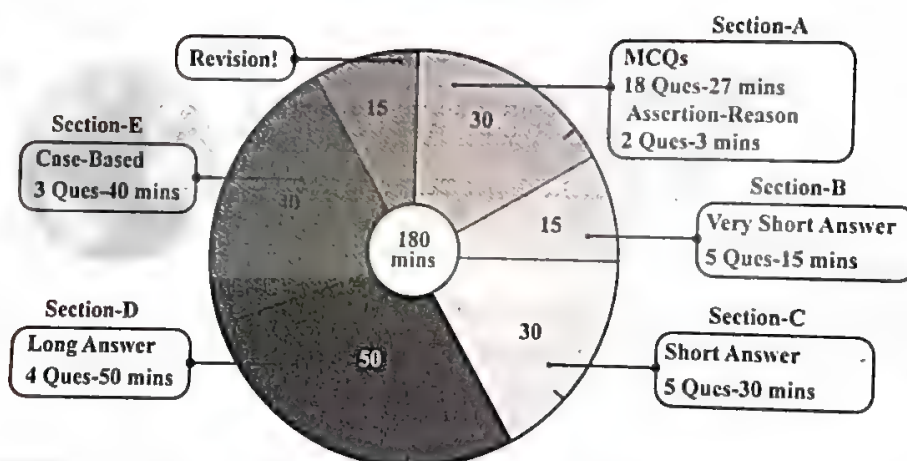
While solving sample papers at home, practice assigning time for each section based on allotted marks and adhere to it for effective time management. Apply this time management strategy during the exam to complete your paper calmly and on time. Refer to the provided pie chart as a guide for time distribution across different subjects.

Time Structuring

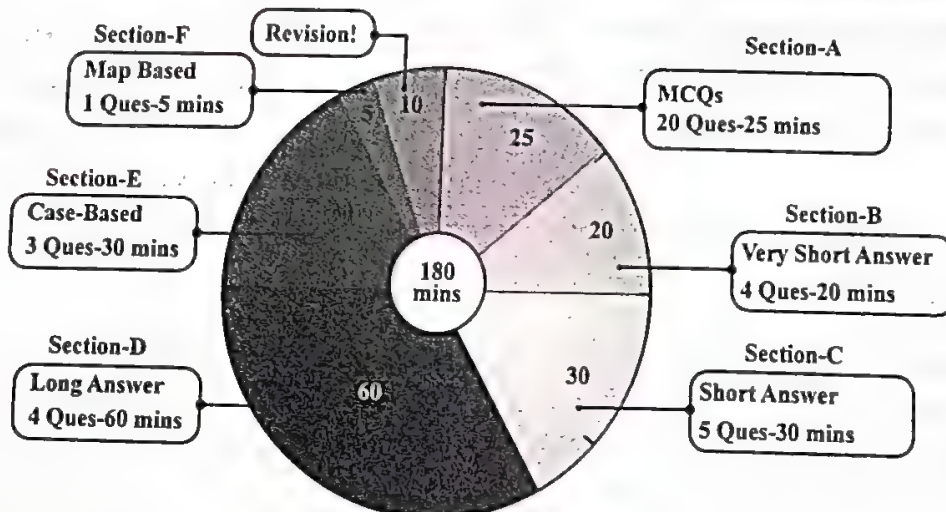
SCIENCE



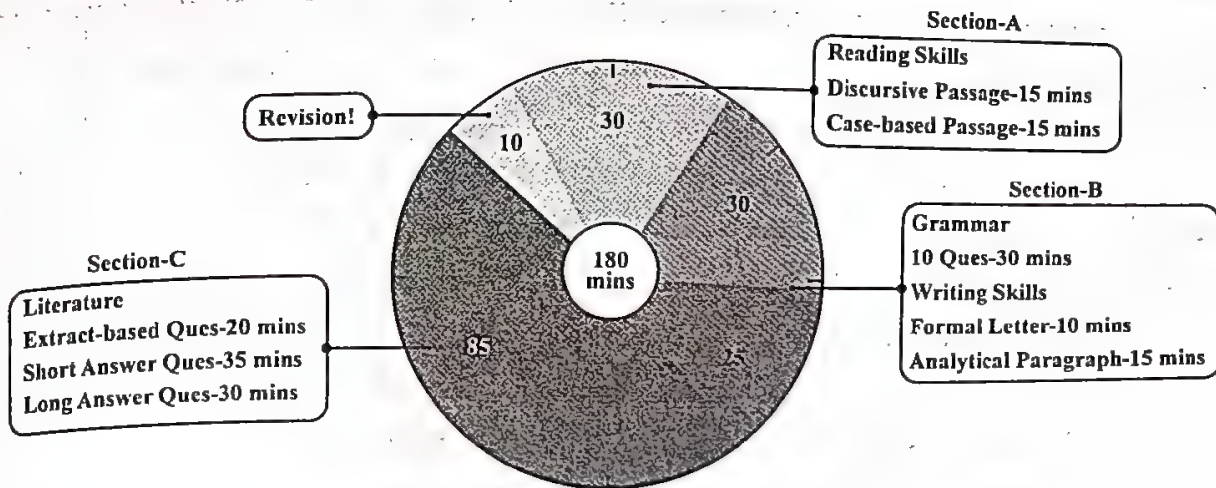
MATHEMATICS



SOCIAL SCIENCE



ENGLISH



5. Start with Your Strength

Start with the easiest and most confident questions. This helps you build momentum, secure marks quickly, and save time for more challenging questions later.

6. Skip Explanations for MCQs to Save Time

For MCQs, including Assertion-Reason questions, avoid writing explanations. Simply write the correct option or answer as required. This will save your valuable time, allowing you to focus more on the other questions and manage your exam more efficiently.

Reference:

| | |
|----|-------------------------------|
| 1. | A) Chancellor Duke Metternich |
| 2. | C) Buddhism |
| 3. | D) I, II, IV, III |
| 4. | B) Roshundari Devi |

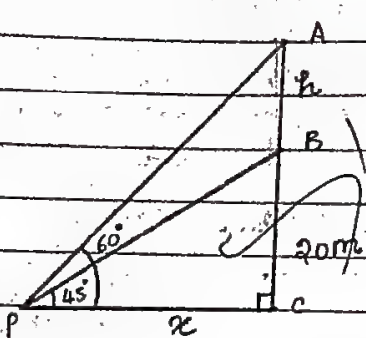

7. Avoid Overthinking and Leave Space for Unanswered Questions

If you come across a difficult question, don't waste time overthinking it. Simply skip it and leave a blank space. This ensures you won't forget to revisit it later if time allows, and helps you quickly locate unanswered questions, ensuring better time management throughout the exam.

8. Solve Key Steps of Complex Questions in the Rough Area to Save Time

For complex questions, solve the key steps in the rough area first. This will help you organize your thoughts and ensure you write the explanation correctly in the answer sheet the first time. By doing this, you avoid wasting time rewriting or correcting answers, allowing you to complete the exam more efficiently.

Reference:

| | | |
|----|--|--|
| 38 |  <p>Let $AB \rightarrow$ Transmission tower $BC \rightarrow$ Building $- 20m$ $P \rightarrow$ Point on the ground.</p> <p>In ΔPBC, $\angle C = 90^\circ$ $\tan 45^\circ = \frac{20}{x} \Rightarrow x = 20m$</p> <p>In ΔPAC, $\angle C = 90^\circ$ $\tan 60^\circ = \frac{h+20}{x}$ $\frac{20+h}{20} = \sqrt{3}$ $h = 20\sqrt{3} - 20$</p> |  <p>$\frac{h+20}{20} = \sqrt{3}$ $h+20 = 20\sqrt{3}$ $h = 20(\sqrt{3}-1)$ $h \approx 20(1.73-1)$ $h \approx 20 \times 0.73$ $h \approx 14.6$</p> |
|----|--|--|

9. Stick to Word Limits

Follow the word range specified in the questions to avoid wasting time. Writing more than required won't earn you extra marks, but it will waste your valuable time that could be used to answer other questions more effectively.

Word Limits for Science

- (iv) **Section B** – Question Nos. 21 to 26 are very short answer type questions. Each question carries 2 marks. Answer to these questions should be in the range of 30 to 50 words.
- (v) **Section C** – Question Nos. 27 to 33 are short answer type questions. Each question carries 3 marks. Answer to these questions should be in the range of 50 to 80 words.
- (vi) **Section D** – Question Nos. 34 to 36 are long answer type questions. Each question carries 5 marks. Answer to these questions should be in the range of 80 to 120 words.

Word Limits for Social Science

- (iv) **Section B** – Question number 21 to 24 are Very Short Answer type questions. Each question carries 2 marks. Answer to these questions should not exceed 40 words.
- (v) **Section C** – Question number 25 to 29 are Short Answer type questions. Each question carries 3 marks. Answer to these questions should not exceed 60 words.
- (vi) **Section D** – Question number 30 to 33 are Long Answer type questions. Each question carries 5 marks. Answer to these questions should not exceed 120 words.

Word Limits for English

The word limits for each question in the Writing Skills section is provided within the question itself.

For example:

- (A) You are Lata/Rahul living at D-305, Sarita Vihar, Delhi. There is a lot of garbage lying on the main road just near the bus stand. Write a letter to the Municipal Commissioner of Delhi, in about **120 words**, complaining against this nuisance.

10. Answer Only: What is Asked

Focus only on what the question asks. Avoid lengthy explanations, unnecessary diagrams, or extra details. This saves time and keeps your answers clear.

For example: In Science exam, if a question asks to describe the function of the heart, there is no need to describe the full circulatory system or draw detailed diagrams unless explicitly asked, or if a question asks to calculate the force acting on an object, just provide the formula and necessary steps without discussing the theory behind Newton's laws unless it's specifically asked. In an English exam, if a question asks you to discuss the character development of a protagonist, avoid discussing other characters or summarizing the entire plot.

Reference:

- (iii) Who was Mrs. Kuperus? What kind of relationship did Anne share with her? **2**

(iii) Mrs. Kuperus was the headmistress of the Montessori Nursery school. She was Anne's class teacher in her sixth form. Anne shared a deep bond with Mrs. Kuperus. Their tears at the time of departure is a testament to this statement.

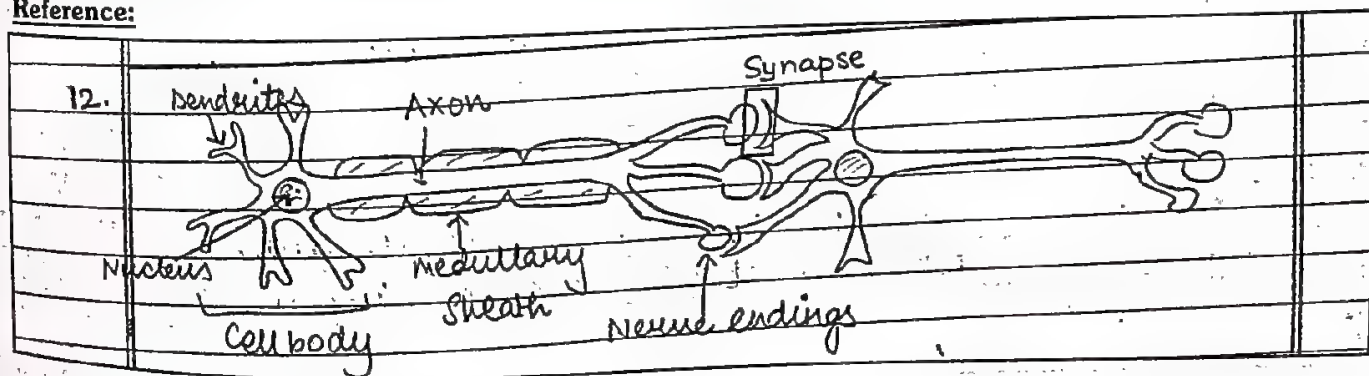
11. Keep an Eye on Your Watch

Regularly check that you're progressing according to your time allocation. This helps you stay on track and prevents spending too much time on any one question, ensuring you complete the entire paper within the allotted time.

12. Avoid Spending Excessive Time on Artistic Details in the Diagram

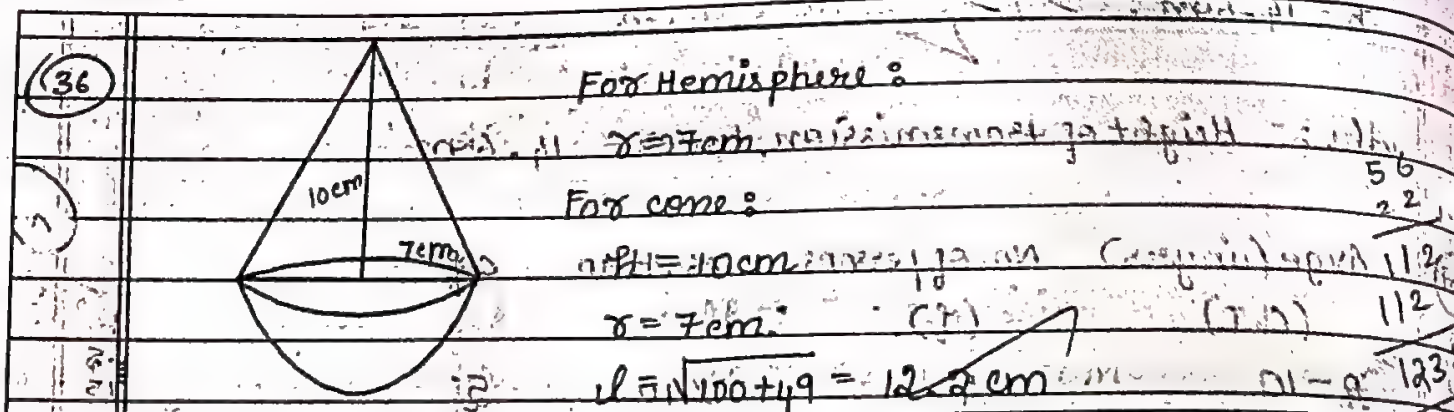
Draw neat, well-labelled diagrams without adding unnecessary details. For example, while drawing a neuron, avoid shading, colouring, or making the dendrites and axon overly artistic.

Reference:



Avoid spending excessive time on perfect proportions or alignment. Instead, focus on drawing a simple, clear diagram with correct labelling.

Reference:



13. Follow a Structured Approach

For essay or long answer type questions, use the structure: Introduction \rightarrow Main Body \rightarrow Conclusion. In Maths, specifically follow the structure: Given \rightarrow To find/To prove \rightarrow Solution/Proof. Plan key points beforehand to stay focused, ensuring clear and concise answers that save time.

Reference:

22.

Given: $A(1, 0)$; $B(-5, 0)$; $C(-2, 5)$

To find: Type of triangle formed

Solution: Using the distance formula i.e., $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ we find the distance between each side.

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(1 + 5)^2 + (0 - 0)^2}$

$= \sqrt{36}$

$= 6 \text{ units}$

$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(-5 + 2)^2 + (0 - 5)^2}$

$= \sqrt{(-3)^2 + (-5)^2} \Rightarrow \sqrt{9 + 25}$

$= \sqrt{34} \text{ units}$

$CA = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(1 + 2)^2 + (0 - 5)^2}$

$= \sqrt{(3)^2 + (-5)^2} \Rightarrow \sqrt{9 + 25}$

$= \sqrt{34} \text{ units}$

Since $\triangle ABC$ has 2 sides (CA and BC) of equal length (each $\sqrt{34}$ units).

14. Review and Revise (Last 10-15 minutes)

Reserve the final 10-15 minutes to review your answers, correct mistakes, and attempt skipped questions. This final check allows you to catch errors, ensure that you have answered every question, and refine your responses for better accuracy, potentially boosting your overall score.

15. Practice Speed Writing

Work on improving your writing speed at home while maintaining clarity. This ensures you don't waste time in the exam, by allowing you to complete all questions within the allotted time while keeping your answers clear and readable, which is crucial for securing maximum marks.

16. Replicate Exam Conditions

Solve past year papers or mocks within the time limit to improve speed, accuracy, and familiarity with the exam format. This practice helps you manage time more effectively, reduces exam anxiety, and builds confidence by simulating the real exam environment, allowing you to perform better under pressure. Practice with **Sample Question Papers** for this.

DON'T SKIP: AVOID UNWANTED ERRORS

1. Misinterpreting Question Terminologies

Students often confuse key terms like true/false, correct/incorrect, always/never, increase/decrease, or chronology (past to present, not opposite) leading to incorrect answers or the opposite of what's being asked. To avoid this, carefully read the question twice and underline or highlight key terms to stay focused.

References:

9. The *incorrect* statement about placenta is :
- (A) It is a disc embedded in the uterine wall.
 - (B) It contains villi on the embryo's side of the tissue.
 - (C) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.
 - (D) The embryo gets nutrition from the mother's blood through it.

18. Arrange the following events in chronological order and choose the correct option from the following: (1 Mark)

- I. Treaty of Constantinople
- II. Defeat of Napoleon
- III. Unification of Italy
- IV. Unification of Germany

Options:

- (a) I, II, IV and III
- (b) II, III, I and IV
- (c) II, I, IV and III
- (d) IV, I, III and II

2. Not Reading All the Options in a MCQ

Don't choose an answer too quickly in Multiple Choice Questions (MCQs). Always read all the options before picking the answer, as sometimes there's a more accurate or specific option than the first one that comes to mind.

3. Avoid Writing Explanations for MCQs

Do not write explanations for MCQs, including Assertion and Reason types. Only write the correct option as the answer.

Reference:

| | |
|----|--|
| 1. | (C) 2,2,4. |
| 2. | (D) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ |
| 3. | (A) calcium phosphate |

4. Never Assume Question Patterns; Read Instructions Carefully

Don't entirely rely on the patterns you practiced from reference books or past papers. Exam questions, especially in format like assertion-reason, may come with variations, such as a sequence of the same options you practiced, but arranged differently. Skipping these instructions in haste can lead to answering incorrectly, even if you know the concept, resulting in unnecessary loss of marks.

References:

11. Two statements are given below. They are Assertion (A) and Reason (R). Read both the statements and choose the correct option.

Assertion (A) : Modern democracy cannot function without political parties.

Reason (R) : Elected representatives will be accountable only to their constituencies, not towards the country.

Options :

- (A) (A) is true, but (R) is false.
- (B) (A) is false, but (R) is true.
- (C) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (D) Both (A) and (R) are true, but (R) is *not* the correct explanation of (A).

12. Two statements are given below. They are Assertion (A) and Reason (R). Read both the statements and choose the correct option. 1

Assertion (A) : Multi-party system has been adopted in India.

Reason (R) : It is capable of accommodating all the social and geographical differences in India.

Options :

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true, but (R) is *not* the correct explanation of (A).
- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

Leaving Easy Questions for Last

Spending too much time on difficult questions and leaving easy ones for the end, which could result in missing out on easy marks due to lack of time. Prioritize answering easy questions first to secure those marks quickly.

Confusions in Solving Assertion-Reason Questions

Students often struggle with choosing the correct answer to Assertion & Reason MCQs even if they understand the concept. To avoid this,

First, carefully evaluate the assertion and reason: are they true or false?

Second, check the reason: Does it provide a valid and accurate explanation for the assertion? Ensure the reason clarifies *why* the assertion is true, not just stating a related fact.

Third, practice more Assertion & Reason questions to get comfortable with identifying these nuances.

Not Attempting All Questions

Always attempt every question, even if unsure. Leaving questions unanswered means missing potential marks from educated guesses or partial answers. Small efforts can still earn valuable marks.

Be Cautious of Copying Values and Conversion Errors

Ensure you copy values and units exactly as given, like "10 cm" not "10 m," or "kg" not "g." If converting units, align them properly with other data, as errors in copying or conversion can lead to incorrect calculations and cost marks. Always double-check value, units and conversions.

Reference:

26. An electric source can supply a charge of 500 coulomb. If the current drawn by a device is 25 mA, find the time in which the electric source will be discharged completely.

26. $Q = 500 \text{ C}$
 $I = 25 \text{ mA} = \frac{25 \times \text{A}}{1000}$
 $t = ?$

$$I = \frac{Q}{t} \Rightarrow t = \frac{Q}{I} \Rightarrow t = \frac{500 \text{ C}}{\frac{25}{1000} \text{ A}}$$
$$= \frac{500 \times 1000}{25}$$
$$= 20000 \text{ s, or } 333 \text{ m } 20 \text{ s}$$

9. Not Following the Word Limit

Writing too little or too much can cost marks. Writing too little might miss key points, and writing too much can lead to unnecessary details that are not needed, leading to wasting of time. Practice answering within the word limit during preparation and underline key points for clarity of the answer.

Reference:

24. How have the developments in information and communication technology been the major factor to enable globalisation? Explain.

2

24. Information and Communication technology have enabled globalisation in the following ways: -

① Rise of telecommunication technology (telephones, fax) allows the users sitting in distant parts of the world to communicate instantaneously at negligible costs. Internet is present in every sphere of life. Provisions of electronic mail and messages have allowed rapid transmission of messages to happen.

② Satellite imaging has also helped in enhancing information and communication technology and has made the world more interconnected, advanced and fast-forward.

10. Writing Everything You Know, Even if it's Irrelevant

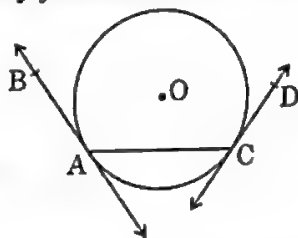
Avoid the temptation to write everything you know about a topic. Stick to what's being asked. Writing off-topic information only wastes time and will not score extra marks.

11. Not Following the Prescribed Format

Writing answers in an unorganized way, such as skipping steps in math problems, or not clearly separating parts of answers (e.g., theory and examples). Practice using the Exam Ready: Answering Templates section for different types of questions to ensure your answers are structured, clear, and easy to follow.

References:

24. In the given figure, AB and CD are tangents to a circle centred at O. Is $\angle BAC = \angle DCA$? Justify your answer. 2



24. Given: AB and CD are tangents to circle with centre O and chord AC.

To find: if $\angle BAC = \angle DCA$

Construction: Join OA and OC

Solution: Consider $\triangle OAC$ where

$OA = OC$ (radii of same circle)

so $\angle OAC = \angle OCA \rightarrow (1)$

(since angles opposite to equal sides in a triangle are equal)

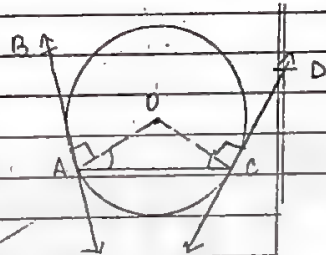
We also know that a tangent to a circle is perpendicular to radius at the point of contact. Since AB and CD are both tangents,

$\angle OAB = \angle OCD \rightarrow (2)$ (as each is equal to 90°)

adding (1) and (2), $\angle OAC + \angle OAB = \angle OCA + \angle OCD$

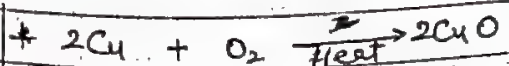
$\angle BAC = \angle DCA$

hence proved that $\angle BAC = \angle DCA$.

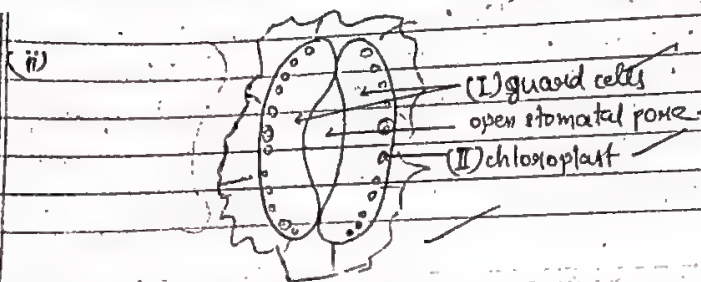


21. (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. 2

21. (a) * Copper (II) oxide is formed. Its colour is Black.



- (ii) Draw the diagram of an open stomatal pore and label (I) Guard cells, and (II) Chloroplast on it. Mention two functions performed by stomata.



Functions of stomata.

- (i) It helps in gaseous exchange of oxygen and carbon dioxide for photosynthesis and respiration.
- (ii) It helps to remove excess water from plant, during transpiration.

12. Poor Handwriting

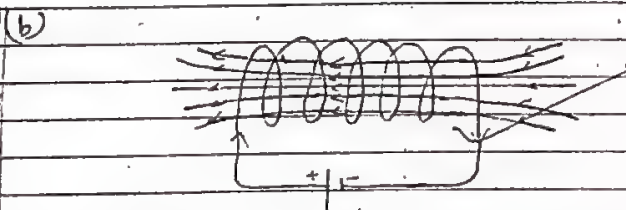
Sometimes, students write quickly or in a way that's difficult to read. Even if the answer is correct, messy handwriting can make it hard for the examiner to understand what's written, which can affect your score. It's important to take your time and write clearly.

13. Incorrect Diagram Labeling

Drawing diagrams correctly but forget to add important labels or place the labels in the wrong positions. This could include missing labels for key parts of the diagram, or placing arrows incorrectly, such as in ray diagrams or when indicating direction of current flow.

Reference:

- (b) Draw the magnetic field lines inside a current carrying solenoid.
What does this pattern of magnetic field lines indicate?



The magnetic field lines are ~~straight~~ straight and parallel to each other indicating that there is a uniform magnetic field inside solenoid.

14. Calculation Errors Despite Knowing the Formula

Students may correctly apply the formula but make simple mistakes in calculations, such as adding / subtracting / multiplying / dividing incorrectly, missing out on necessary steps, or misplacing decimal points, leading to wrong final answers.

15. Forgetting to Cross-Check Answers to Complex Questions

Don't skip rechecking complex answers, especially in Physics and Chemistry. After solving numerical problems or long answer questions, take a moment to verify your results. Small mistakes in sign, unit conversion, or decimal places can lead to incorrect answers.

16. Unintentionally Missing Subpart Questions

Focusing too much on the main question and overlooking the subparts, often due to time pressure, stress, or not noticing the numbering format, which can lead to incomplete answers. To avoid this, always read the entire question carefully and tick off each subpart as you complete it.

17. Writing Answers without Proper Units

Avoid writing answers like "10" instead of "10 m/s" for velocity or "5" instead of "5 N" for force. Forgetting units can turn a correct answer into an incomplete one and lose precious marks. Always cross-check if every numerical answer includes the correct unit before moving to the next question.

Reference:

(i) $R_1 = 5\Omega$, $R_2 = 10\Omega$, $R_3 = 15\Omega$

$V = 6V$

(ii) $R_{eq} = R_1 + R_2 + R_3$
 $= 5 + 10 + 15$
 $= 30\Omega$

$I = \frac{V}{R} = \frac{6}{30} = 0.2A$

(iii) $V_2 = IR_2$
 $\Rightarrow V_2 = 0.2 \times 10$
 $\Rightarrow V_2 = 2V$

18. Not Dividing Time Effectively for Each Section

Don't spend too much time on one question or one section. The exam is designed to test all your knowledge, so allocate time based on the marks. For example, don't spend 20 minutes on a 2-mark question when you could easily finish it in 5 minutes. Practice solving sample papers with a timer (refer to 4. of Time Management Tips) to develop a sense of time management for each section.

19. Attempting all questions from a group/section of questions given with choice

Students should read instructions properly where a group of questions is given from which they have to attempt a certain number of questions of their choice. It saves them from wasting their time.

Reference:

(ii) On the same Political outline map of India, locate and label any three of the following with suitable symbols:

- | | |
|----------------|----------------------------|
| (a) Hirakud | - Dam |
| (b) Mumbai | - Software Technology Park |
| (c) Raja Sansi | - International Airport |
| (d) Naraura | - Nuclear Power Plant |

20. Ensure Proper Grammar Usage

Pay attention to your sentence structure, subject-verb agreement, and punctuation while writing. Go through them again to fix any grammar mistakes.

21. Use Textual Instance for Literature Questions

Always use quotes or examples from the text to back up your answers in literature questions. This makes your answer stronger and shows you understand the material. Make sure to refer to the text for accurate details.

INSTRUCTIONS FOR FILLING THE OMR SHEET

Use a black or blue ballpoint pen to fill the OMR sheet. Pencils or gel pens are not allowed.
Carefully read the instructions given on the OMR sheet before filling it out.
While filling the name, leave a block between your first name, middle and last name.
The student has to fill the following particulars in the answer sheet:

From Admit Card

1. Subject
2. Sub Code
3. Date of Examination
4. Candidate's Name
5. Father's Name
6. Roll No. (In digits)
7. Roll No. (In words)
8. Centre No.
9. School No.

From Question Paper

10. Set Number
11. Code Number



ADMIT CARD CENTRAL BOARD OF SECONDARY EDUCATION, DELHI

ADMIT CARD FOR SECONDARY EXAMINATION 2024

LATEST ENTRY IN EXAMINATION CENTRE 30 MIN BEFORE THE EXAM START 10 AM (IST)



Roll No.

22122532

Date of Birth

26/02/2019

School No.

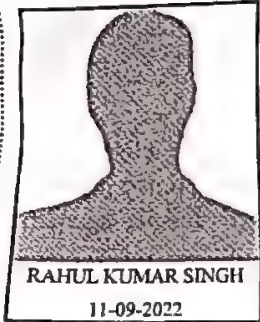
65345

Centre No.

8407

Roll. No. (In words)

TWO CRORE TWENTY ONE LAKH TWENTY TWO THOUSAND FIVE HUNDRED THIRTY TWO ONLY



Examination

SECONDARY - CLASS: 10

Candidate's Name

RAHUL KUMAR SINGH

Mother's Name

REKHA DEVI

Father/Guardian's Name

OM PRAKASH SINGH

of School

Exam Centre

Category of PwD

Not Applicable

Admit Card ID

RR536521



| SUB CODE | SUBJECT NAME | MEDIUM | DATE |
|----------|-----------------------------------|--------|------------|
| 002 | HINDI COURSE-A | ... | 21.02.2024 |
| 184 | ENGLISH (LANGUAGE AND LITERATURE) | ... | 26.02.2024 |
| 086 | SCIENCE | ... | 02.03.2024 |
| 087 | SOCIAL SCIENCE | ... | 07.03.2024 |
| 041 | MATHEMATICS STANDARD | ... | 11.03.2024 |

QUESTION PAPER

Series WYXZ1/4



Set No. 2

Q.P. Code 2/4/2

Roll No.

2 1 2 2 5 3 2

Candidates must write the Q.P. Code on the title page of the answer book.

The details provided in the admit card are imaginary; if you found something resembling anyone's details, then it could be by chance.

विषय Subject: SCIENCE
विषय कोड Subject Code: 086
परीक्षा का दिन एवं तिथि Day & Date of the Examination: MONDAY 02/03/2024
उत्तर देने का माध्यम Medium of answering the paper: ENGLISH

प्रश्न पत्र के ऊपर लिखे कोड को दर्शाए:
Write code No. as written on the top of the question paper
Code Number: 2/4/2
Set Number: 1 2 3 4

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या
No. of supplementary answer-book(s) used

विकलांग व्यक्ति: हाँ / नहीं
Person with Disabilities: Yes / No

किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ✓ का निशान लगाएँ।
If physically challenged, tick the category

B = बृद्धिहीन, D = मूक या चर्धर, H = शारीरिक रूप से विकलांग,
S = स्पास्टिक, C = डिस्लेक्सिक, A = ऑटिस्टिक
B = Visually Impaired, D = Hearing Impaired, H = Physically Challenged
S = Spastic, C = Dyslexic, A = Autistic

क्या लेखन - लिपिक उपलब्ध कराया गया: हाँ / नहीं
Whether writer provided: Yes / No

यदि वृद्धिहीन है तो उपयोग में आए सॉफ्टवेयर का नाम:
If Visually challenged, name of software used:

एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।
Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

कार्यालय उपयोग के लिए
Space for office use

To be filled in by the candidate as per as per Admit Card
लिखें तथा संगत गोले को पूरे गहरे निशान से भरें।
Write and darken the appropriate circle as applicable.
परीक्षार्थी का नाम बड़े अक्षरों में Candidate's Name in CAPITAL letters

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | A | H | U | L | K | U | M | A | R | S | I | N | G | H |
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| P | Q | R | S | T | U | V | W | X | Y | Z | | | | |

विषय Subject: SCIENCE

अनुक्रमांक (शब्दों में) Roll No. (In words) TWO
 Crore..... TWENTY ONE..... Lakhs..... THOUSANDS
 पिता/संरक्षक का नाम FATHER'S/GUARDIAN'S NAME: OM PRAKASH SINGH
 परीक्षार्थी के हस्ताक्षर Signature of Candidate: (Candidate's signature in black/blue ballpoint pen)

इस पृष्ठ पर परीक्षार्थी द्वारा भरे गए सम्पूर्ण विवरण की जांच कर ली गई है।
 All the particulars filled in by the candidate on this page have been verified

सहायक अधीक्षक के हस्ताक्षर Signature of Asstt. Supdt.
 अधीक्षक की मोहर Facsimile stamp of the Centre supdt.



SCIENCE

CHEMICAL EQUATIONS

TYPES

- It is the representation of chemical reaction in symbols and it needs to be balanced.
E.g.: $Mg(s) + O_2(g) \rightarrow 2MgO(s)$
- As per law of conservation of mass, total mass of the elements present in the products of a chemical reaction has to be equal to the total mass of the elements present in the reactants.

- **Chemical Change:**
Reactants transform into products. Irreversible.
E.g.: Curdling of milk
- **Physical Change:** No new substances are formed
Reversible
E.g.: Melting of ices

TYPE OF CHANGE & CHARACTERISTICS

Represented as

CHEMICAL REACTIONS AND EQUATIONS

EFFECTS OF OXIDATION



- (a) **Corrosion:** Degradation of metals.
E.g.: Rusting of iron (Rust $Fe_2O_3 \cdot xH_2O$), Tarnishing of Ag.
- Prevention:**
- Galvanisation
 - Painting, oiling, etc.
- (b) **Rancidity:** Oxidation of foods containing oils and fats, causing smell and taste change.
- Preventions**
- Flushing of Nitrogen gas
 - Refrigeration

- **Combination reaction:** When 2 or more reactants combine to form single product **CBSE 2024; 2020**
E.g.: $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$
- **Decomposition reaction:** Single reactant breaks down into 2 or more products. It is of following types: **CBSE 2020**

1. **Thermal Decomposition**, by heat

CBSE 2024; 2023; 2022; Term-I



2. **Photo Decomposition**, by light



3. **Electrolytic decomposition** by electricity

CBSE 2024



- **Single displacement reaction:** More reactive element displaces less reactive elements from its salt solution. **CBSE 2023; 2022; Term-I**



- **Double displacement reaction:** Exchange of ion takes place between reactants.

CBSE 2022; Term-I; 2020



- **Exothermic Reaction:** Reaction in which heat is released. **CBSE 2024; 2022; Term-I; 2020**



+ energy

- **Endothermic Reaction:** Reaction in which heat is absorbed. **CBSE 2023**

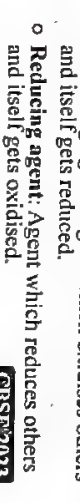


• **Redox Reactions** **CBSE 2022; Term-I**

- **Oxidation:** (a) Addition of O_2 (b) Removal of H_2
- **Reduction:** (a) Addition of H_2 (b) Removal of O_2

◦ **Oxidising agent:** Agent which oxidises others and itself gets reduced.

◦ **Reducing agent:** Agent which reduces others and itself gets oxidised. **CBSE 2023**



Oxidation $\rightarrow H_2$

Reduction $\rightarrow CuO$

Oxidising agent $\rightarrow CuO$

Reducing agent $\rightarrow H_2$

CHAPTER - 1 CHEMICAL REACTIONS AND EQUATIONS

Cheat Sheet



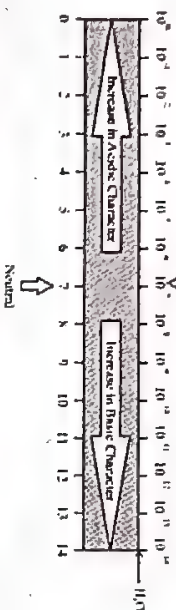
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CHAPTER-2 ACIDS, BASES AND SALTS

pH SCALE

CBSE 2024, 2022 Term-I

- $\text{pH} = -\log[\text{H}^+]$
- The values on the pH scale range from 0 to 14.
- For acidic solutions, $\text{pH} < 7$
- For neutral solutions, $\text{pH} = 7$
- For basic solutions, $\text{pH} > 7$



| Strong Bases | Weak Bases |
|--|--|
| Produce more OH^- ions in aqueous solutions | Produce less OH^- ions in aqueous solutions |
| E.g. $\rightarrow \text{NaOH}$ | E.g. $\rightarrow \text{NH}_4\text{OH}$ |

Physical Properties

CBSE 2022 Term-I

- Bitter in taste
 - Aqueous solution conducts electricity
 - Soapy in touch
 - Bases that are soluble in water : Alkali
- Note: All alkalis are bases but all bases are not alkali.

Chemical Properties

CBSE 2020

- Base + Metal \rightarrow Salt + $\text{H}_2 \uparrow$
- Base + Non-metal oxide \rightarrow Salt + H_2O

Physical Properties

- Sour in taste
- Aqueous solution conducts electricity
- Corrosive in nature

Chemical Properties

- Metal + Acid \rightarrow Metal salt + $\text{H}_2 \uparrow$ (burns with a pop sound)
- Metal Carbonate + Acid \rightarrow Metal salt + $\text{CO}_2 \uparrow$ + H_2O

(turns lime water milky)

CBSE 2023, 2022 Term-I

- Metal Hydrogen Carbonate + Acid \rightarrow Metal Salt + $\text{CO}_2 \uparrow$ + H_2O
- Neutralisation: Acid + Base \rightarrow Salt + Water
- Metal oxide + Acid \rightarrow Salt + H_2O

Synthetic Indicators

- Methyl orange (Natural colour \rightarrow orange)
 - Acid \rightarrow Red colour,
 - Base \rightarrow Yellow colour
- CBSE 2022 Term-I, 2020
- Phenolphthalein (Natural colour \rightarrow colourless)
 - Acid \rightarrow Colourless,
 - Base \rightarrow Pink colour

Natural Indicators

- Turmeric



- Acid \rightarrow Yellow colour,
- Base \rightarrow Red colour



Red Cabbage

- Acid \rightarrow Red colour,
 - Base \rightarrow Green colour
- Linnaeus solution
- CBSE 2022 Term-I
- Acid \rightarrow Red colour,
 - Base \rightarrow Blue colour

Olfactory indicators

(based on odour/smell)



Onion



Vanilla extract



Clove oil

Strong Acids

Produce more H^+ ions in aqueous solutions

E.g. $\rightarrow \text{HCl}$, HNO_3 , H_2SO_4

Weak Acids

Produce less H^+ ions in aqueous solutions

E.g. \rightarrow Citric acid

| Natural source | Acid | Natural source | Acid |
|----------------|---------------|------------------|----------------|
| Vinegar | Acetic acid | Sour milk (Curd) | Lactic acid |
| Orange | Citric acid | Lemon | Citric acid |
| Tamarind | Tartaric acid | Ant sting | Methanoic acid |
| Tomato | Oxalic acid | Nettle sting | Methanoic acid |

Cheat Sheet



To Access One Shot Revision Video Scan This QR Code

| Types of salts | | |
|--|---|--|
| Basic | Acidic | Neutral |
| <ul style="list-style-type: none"> Salts of strong base + weak acid pH > 7 E.g; Na_2CO_3, K_3PO_4 etc. | <ul style="list-style-type: none"> Salts of strong acid + weak base pH < 7 E.g; NH_4Cl, $(\text{NH}_4)_2\text{SO}_4$ etc. | <ul style="list-style-type: none"> Salts of strong acid + strong base pH = 7 E.g; NaCl, NaNO_3 etc. |

ACIDS,
BASES
AND SALTS

Salts

Uses:

Common Salt (NaCl):

- Important raw material for formation of many compounds.

Cautic Soda (NaOH):

- Used in the manufacturing of soaps and detergents.

Washing Soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$): **CBSE 2020**

- Remove permanent hardness of water.

Baking soda (NaHCO_3): **CBSE 2022 Term-I**

- Used in the manufacturing of baking powder and as an antacid.

Bleaching powder (CaOCl_2):

- Used as bleaching agent in the textile and paper industries and for disinfecting water.

Plaster of Paris (POP):

- Used as plasters for setting broken and fractured bones; for making moulds.

Examples

Common Salt (NaCl)



Cautic Soda (NaOH)



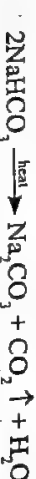
CBSE 2020

At anode At cathode

Washing Soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) **CBSE 2023, 2020**



Baking soda (NaHCO_3) **CBSE 2023**



Bleaching powder (CaOCl_2) **CBSE 2020**



(Slaked lime)

Blue vitriol ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) **CBSE 2023**



(Blue)

(White)

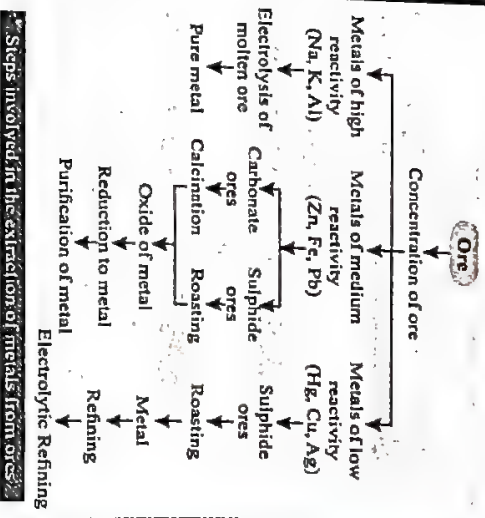
Plaster of Paris (POP) **CBSE 2023, 2022 Term-I**



(Gypsum) (POP)

CHAPTER-3 METALS AND NON-METALS

Extraction of metals



CBSE 2024 Term-2020

Chemical Properties

- Metal + Oxygen \rightarrow Metal Oxide **CBSE 2023**
- $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$
- Amphoteric oxides: Reacts with both acids and bases **CBSE 2024 Term-2023**
- $\text{Al}_2\text{O}_3 + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2\text{O}$
- $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$
- Metal oxide + Water \rightarrow Metal Hydroxide **CBSE 2023 Term-1**
- $\text{Na}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)}$
- Metal + Water \rightarrow Metal Oxide + Hydrogen **CBSE 2022 Term-1**
- Metal Oxide + Water \rightarrow Metal Hydroxide **CBSE 2022 Term-1**
- $2\text{K} + 2\text{H}_2\text{O} \rightarrow 2\text{KOH} + \text{H}_2\uparrow$
- Metal + Steam \rightarrow Metal oxide + Hydrogen Gas **CBSE 2020**
- $2\text{Al(s)} + 3\text{H}_2\text{O(g)} \rightarrow \text{Al}_2\text{O}_3\text{(s)} + 3\text{H}_2\text{(g)}$
- Metal + Acid \rightarrow Salt + Hydrogen Gas **CBSE 2022 Term-1**
- $2\text{Na} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\uparrow$
- Metal + Hydrogen \rightarrow Metal Hydride
- $2\text{Na} + \text{H}_2 \rightarrow 2\text{NaH}$
- Metal + Base \rightarrow Metal Salt + Hydrogen Gas
- $\text{Zn} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$

METALS

NON-METALS

NON-METALS

IONIC COMPOUNDS

Reactivity Series

A metal with high reactivity can displace a metal with low reactivity from its salt solution.

$\text{K} > \text{Na} > \text{Ca} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Sn} > \text{Pb} > \text{H} > \text{Cu} > \text{Hg} > \text{Ag} > \text{Au} > \text{Pt}$



Cheat Sheet

Corrosion

- Rusting of Iron: $4\text{Fe} + 2\text{nH}_2\text{O} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 \cdot \text{nH}_2\text{O}$
- Tarnishing of Copper: $2\text{Cu} + \text{H}_2\text{O} + \text{CO}_2 + \text{O}_2 \rightarrow \text{Cu(OH)}_2 \cdot \text{CuCO}_3$ (Brick red)
- Tarnishing of Silver: $2\text{Ag} + \text{H}_2\text{S} \rightarrow \text{Ag}_2\text{S} + \text{H}_2$ (Black)

Physical Properties

- Solid (Exception- Hg)
- Malleable and ductile (Exception- Zn, Hg)
- Sonorous (Exception- Na, K)
- Lustrous- shiny (Exception- Bi)
- High M.P. & B.P. (Exception- Ga)
- High density (Exception- Li, Na and K)
- Good conductors of heat and electricity
- Hard (Exception- Na, K)

Physical Properties

- Solid and gas (Exception- Br)
- Soft and brittle (Exception- Diamond)
- Non sonorous
- Low M.P. and B.P.
- Non malleable and non ductile
- Dull (Exception- iodine and graphite)
- Poor conductor of heat and electricity (Exception- graphite)

Prevention

- Applying oil or grease
- Applying paint
- By Galvanisation.
- By Alloying

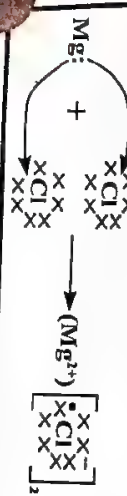
Alloys: A homogeneous mixture of two or more metals or a metal and a non-metal

1. Brass \rightarrow Cu + Zn
2. Bronze \rightarrow Cu + Sn
3. Solder \rightarrow Pb + Sn
4. Stainless Steel \rightarrow Fe + Cr + Ni

Formation of Ionic compounds

Formed by the complete transfer of electrons from a metal to a non-metal. Ex. Formation of MgCl_2

$\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$; $\text{Cl} + \text{e}^- \rightarrow \text{Cl}^-$ (anion)



Physical properties of Ionic compounds

- Crystalline Solid
- High M.P and B.P.
- Soluble in water & insoluble in solvents like kerosene.
- Good conductors of electricity in aqueous solution and molten state
- Do not conduct electricity in solid state.



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CHAPTER-4

CARBON AND ITS COMPOUNDS



Cheat Sheet

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Covalent bond:

CBSE 2024, 2022 Term-II, 2020

Sharing of electrons between atoms.

It can neither form C^- anion nor C^{4+} cation.

It can only share its valence electrons.

Carbon's tetravalency forms diverse compounds.

Electron Dot Structure

CBSE 2024, 2023, 2022 Term-II

Hydrogen: $H \cdot H$

Oxygen: $O=O$

Nitrogen: $N \equiv N$



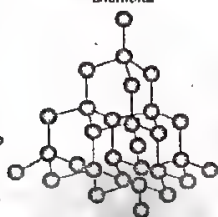
Bonding
in Carbon
- The
Covalent
Bond

Allotropes of Carbon

CBSE 2022 Term-II

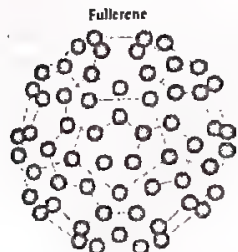
- **Diamond:** Tetrahedral, 3-D arrangement, hardest natural substance.

Diamond



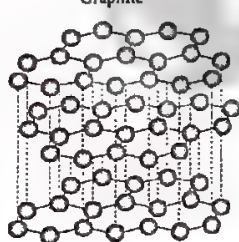
- **Graphite:** Hexagonal layers, smooth and slippery, conducts electricity.

Graphite



- **Fullerene:** atoms arranged in the shape of a football

Fullerene



Carbon and its
Compounds

Versatile Nature of
Carbon

Reasons

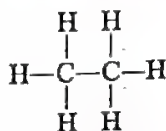
SATURATED AND UNSATURATED CARBON COMPOUNDS

CBSE 2023, 2022 Term-II

- **Saturated (Alkanes):** Single carbon-carbon bonds.

General formula: C_nH_{2n+2}

Example: Ethane (C_2H_6).

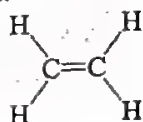


- **Unsaturated**

(Alkenes): Double carbon-carbon bonds.

General formula: C_nH_{2n}

Example: Ethene (C_2H_4).



(Alkynes)

Triple carbon-carbon bonds.

General formula: C_nH_{2n-2}

Example: Ethyne (C_2H_2).

$H-C \equiv C-H$.

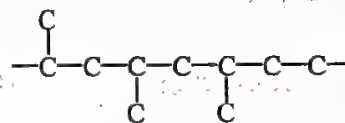
NOMENCLATURE OF CARBON COMPOUNDS

CBSE 2024, 2022 Term-II, 2020

Prefix + Root word + Primary suffix + secondary suffix

| Class of compounds | Prefix/Suffix | Example |
|--------------------|-----------------------------------|---|
| 1. Halo alkane | Prefix- chloro, bromo, etc. | $\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C-Cl \\ & & \\ H & H & H \end{array}$ Chloropropane $\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C-Br \\ & & \\ H & H & H \end{array}$ Bromopropane |
| 2. Alcohol | Suffix - ol | $\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C-OH \\ & & \\ H & H & H \end{array}$ Propanol |
| 3. Aldehyde | Suffix - al | $\begin{array}{c} H & H & H \\ & & \\ H-C & -C & -C=O \\ & & \\ H & H & H \end{array}$ Propanal |
| 4. Ketone | Suffix - one | $\begin{array}{c} H & & H \\ & & \\ H-C & -C & -C-H \\ & & \\ O & & H \end{array}$ Propanone |
| 5. Carboxylic acid | Suffix - oic acid | $\begin{array}{c} H & H & O \\ & & \\ H-C & -C & -C-OH \\ & & \\ H & H & H \end{array}$ Propanoic acid |
| 6. Alkenes | Suffix - ene | $\begin{array}{c} H & H & & H \\ & & & \\ H-C & -C & =C & -H \\ & & & \\ H & & & H \end{array}$ Propene |
| 7. Alkynes | Suffix - yne | $\begin{array}{c} H \\ \\ H-C & -C \equiv C-H \\ \\ H \end{array}$ Propyne |

Catenation: Carbon atoms form long chains.



Tetravalency: Carbon has a valency of four, it is capable of bonding with four other atoms of carbon or atoms of some other mono-valent element.

Cheat Sheet

HOMOLOGOUS SERIES
Series of compounds with similar functional groups.
Characteristics
Differ by $-\text{CH}_2$ and 14 u molecular mass.
Identical chemical properties.

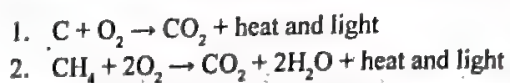
Chemical Properties

Carbon and its Compounds

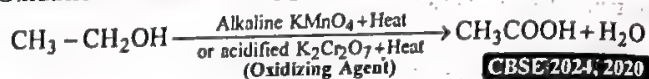
Some Important Carbon Compounds

Soaps and Detergents

• **Combustion:** The process of burning of carbon compounds in O_2 .
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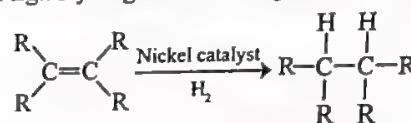
• **Oxidation:** Addition of oxygen.



• **Substitution:** In the presence of sunlight, Cl can replace the hydrogen of saturated hydrocarbon.



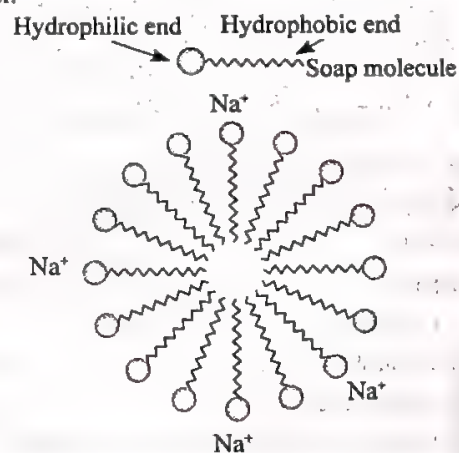
• **Addition:** Unsaturated compound + Reagent \rightarrow Saturated compound. Eg.: Hydrogenation of vegetable oil. CBSE 2023



SOAPS

CBSE 2023, 2020

- They are sodium or potassium salts of long-chain carboxylic acids.
- Most filth is oily in nature, and oil does not dissolve in water.
- The ionic end of soap interacts with water, whereas the carbon chain interacts with oil.
- Thus, the soap molecules form **micelles**, which have one end facing the oil droplet and the other ionic end facing the outside. Micelle, thus helps in pulling out the dirt from water.



- Soap forms insoluble precipitate of calcium and magnesium salts in hard water called scum.

DETERGENTS

CBSE 2020

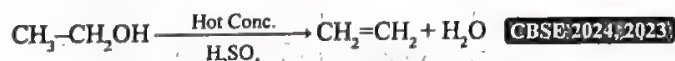
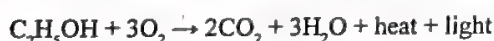
- Detergents are generally sodium salts of sulphonic acids or ammonium salts with chlorides or bromides ions, etc.
- They remain effective in hard water.
- Detergents are usually used to make shampoos and products for cleaning clothes.

• Ethanol ($\text{C}_2\text{H}_5\text{OH}$):

Properties: Volatile, good solvent

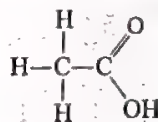
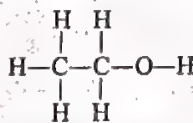
Uses: Medicines, anti-freeze, alcoholic beverages

Reaction: $2\text{Na} + 2\text{CH}_3\text{CH}_2\text{OH} \rightarrow 2\text{CH}_3\text{CH}_2\text{O}^-\text{Na}^+ + \text{H}_2$ CBSE 2024, 2023, 2020
(Sodium ethoxide)



Denatured alcohol: Undrinkable alcohol with toxic substances like methanol. **Absolute Alcohol:** Pure ethanol.

Tincture of iodine: Solution of iodine in alcohol, used as an antiseptic.

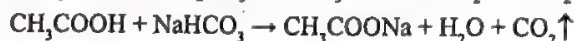
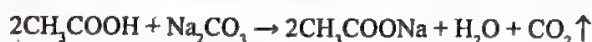
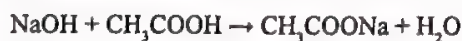
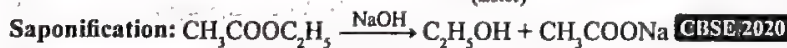
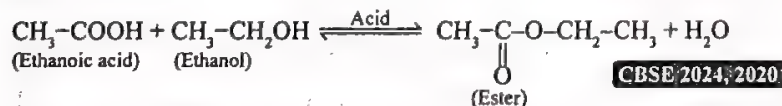


• Ethanoic Acid (CH_3COOH):

Properties: Weak acid.

Uses: Vinegar, food preservation, in making perfumes.

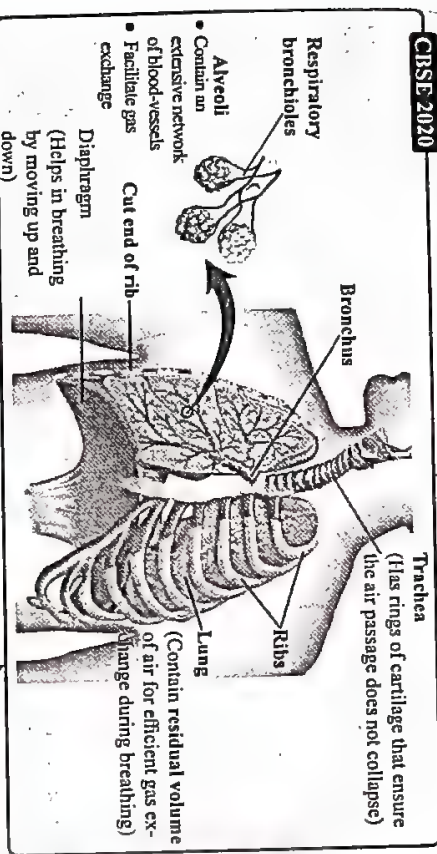
Reaction:



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| Inhalation | Exhalation |
|---|---|
| Diaphragm flattens and move downwards | Diaphragm become dome shaped and raised upwards |
| Chest cavity enlarges and ribs move upwards | Chest cavity reduces and ribs move downwards |

Inhalation vs Exhalation

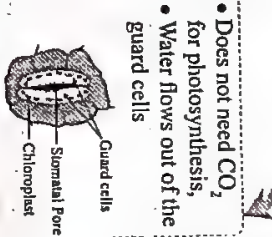
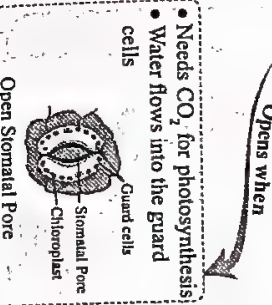


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Aquatic vs Terrestrial
Aquatic organisms breathe faster than terrestrial due to less dissolved oxygen in water vs air.

Hemoglobin
(Why is it needed in organisms with large body size?)
• Large bodies require more oxygen than diffusion alone can supply.
• It has a higher affinity for oxygen

Stomata
CBSE 2024-2023
2022/Term-1
Tiny pores found on the surface of leaves
Opens when
Closes when



Equation of Photosynthesis
 $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$
(Glucose)

- Absorption of light energy by chlorophyll
- Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
- Reduction of carbon dioxide to carbohydrates.

Key events in photosynthesis

Adaptations in Desert Plants for Photosynthesis

Due to closed stomata in daytime desert plants absorb CO₂ at night and utilize it for photosynthesis during the day.

Saprophytic Nutrition
• Obtain food from dead and decaying organisms
• Break down the food material outside the body and then absorb it. E.g: Bread mould (*Rhizopus*), yeast, and mushrooms.

Autotrophic Nutrition
• Synthesis of food from inorganic substances
• Uses sunlight/chemical energy (e.g., photosynthesis)

Parasitic Nutrition
Derive nutrition from plant and animals without killing them. E.g: *Cuscuta*, lice, leeches etc.

Nutrition
Process by which organisms take food and convert it into energy

Types of Nutrition

Heterotrophic Nutrition
Organisms obtained their food from other organisms

Holozoic Nutrition
Organisms ingest solid food and digest it internally. E.g: *Amoeba*, *Paramecium*, Humans, Dog etc.

Life Processes

Human Respiratory System Parts and its functions

In Animals

Respiration
Exchange of gases (O₂ and CO₂)

In Plants

In Unicellular Organisms
Food may be taken in by the entire surface
E.g: *Amoeba* and *Paramecium*

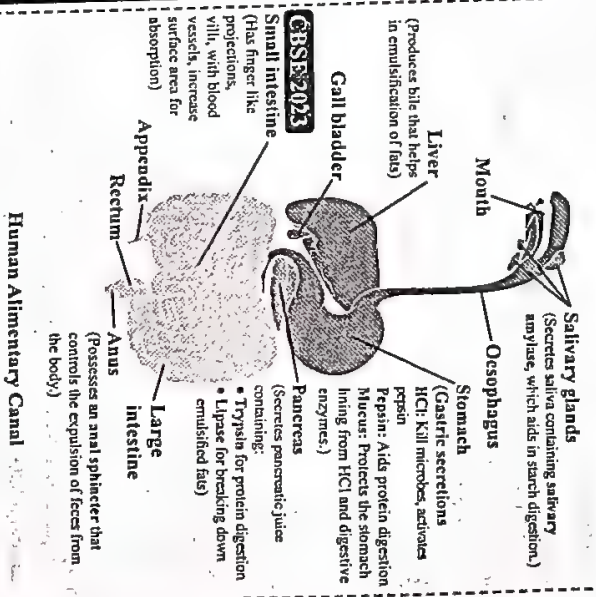


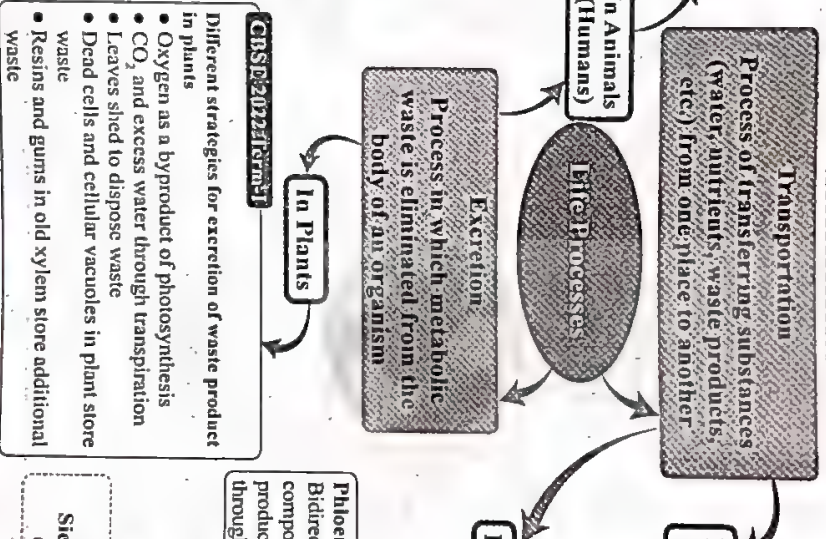
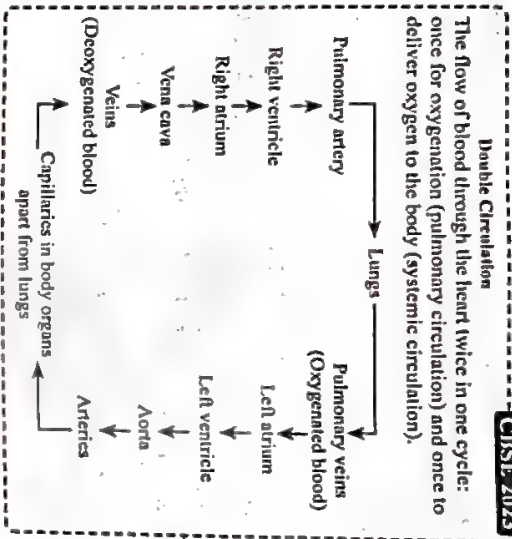
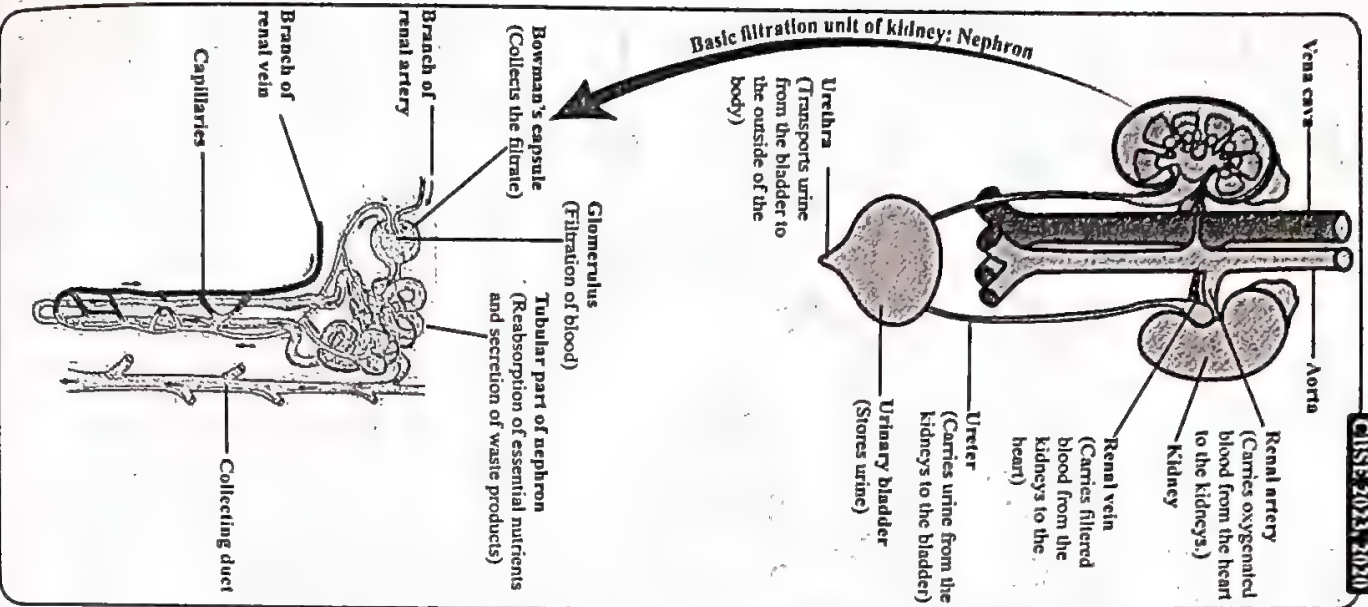
CBSE 2022/Term-1
Glucose Metabolism
Glucose (6-carbon molecule) → Pyruvate (3-carbon molecule) → Lactic acid + Energy (in our muscle cells)
Absence of oxygen (in yeast) → Ethanol + Carbon dioxide + Energy (2-carbon molecule)
Presence of oxygen (in mitochondria) → Carbon dioxide + Water + Energy

Break-down of glucose by various pathways

In Multicellular Organisms (Humans)
• Accomplished by the use of alimentary canal.
• Consist of following steps: Ingestion, Digestion, Absorption, Assimilation and Egestion

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Arteries
Carry oxygenated blood away from the heart except pulmonary arteries (carry deoxygenated blood).

Veins
Carry deoxygenated blood to the heart except pulmonary veins (carry oxygenated blood). Have valves to ensure one-way flow.

Capillaries
Smallest blood vessels connecting arteries and veins, one cell thick. Facilitating nutrient and waste exchange between blood and tissues.

Heart
Muscular organ that pumps blood throughout the body.

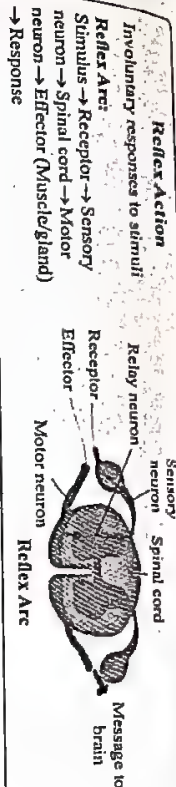
Significance of Heart Chamber
Separation in birds and mammals
Prevents mixing of oxygenated and deoxygenated blood
Ensures efficient oxygen supply to the body.
Supports high energy requirements for body temperature regulation.

Lymph
Tissue fluid similar to plasma. Formed by plasma, proteins, blood cells escape through capillary pores into intercellular spaces in the tissues. Colorless and contains less protein. Drains into the lymphatic system and returns to veins.

Phloem
Bidirectional movement of organic compounds, primarily sugars produced during photosynthesis, throughout the plant.

Xylem
Upward transport of water and minerals from the roots to the leaves and other parts of the plant. Root pressure: Ion absorption in roots creates pressure to push water upwards; active at night. Transpiration pull: Evaporation from leaves creates suction, pulling water upward during the day, aiding mineral transport and cooling.

Sieve tubes, aided by companion cells
Accomplished by



Cranial Nerves
(Emerge from brain; 12 pairs)

Spinal Nerves
(Emerge from spinal cord; 31 pairs)

Peripheral Nervous System
consist of

Are all involuntary actions reflex actions?

| Involuntary Actions | Reflex Actions |
|--|--|
| Do not always require an external stimulus | Require external stimulus |
| Regulated by the brain | Regulated by the spinal cord |
| It may be quick or slow | Always quick |
| E.g., Heartbeat, digestion | E.g., Immediate withdrawal from a hot object, eye blinking |

Nervous System in Humans

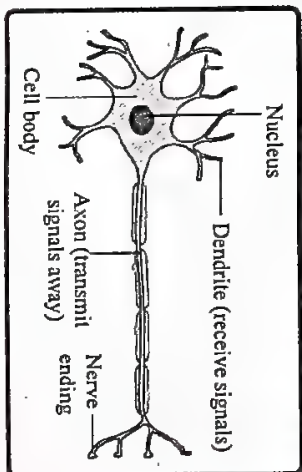
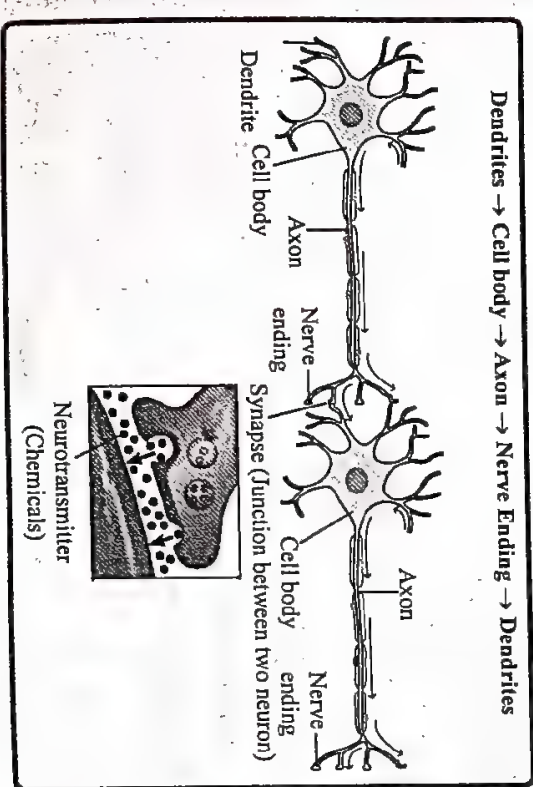
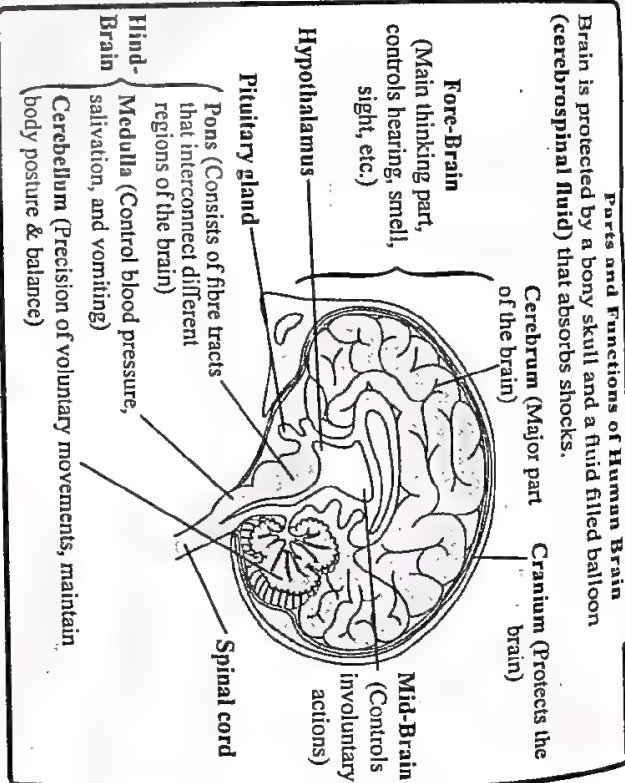
Central Nervous System
Control and Coordination

Nervous Tissue
(Made up of neurons, transmits signals)

Structure of Neuron

Spinal Cord

- Connects brain to rest of the body.
- Reflex arc are formed here.
- Protected by vertebral column.



CHAPTER-6 CONTROL AND COORDINATION

Cheat Sheet



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Video Scan This QR Code

| Type of Movement | Stimulus | Part of Plant Acting |
|--|---------------|---|
| Nastic Movement (Non-directional, growth independent) | Touch/Contact | Folding of the leaflet of <i>Mimosa pudica</i> (<i>Chhui-mui</i> plant) |
| CBSE 2023 Tropic Movement (Directional, growth dependent) | Phototropism | <ul style="list-style-type: none"> Shoot/plumule of seed: Positive phototropism Root: Negative phototropism Flower: Movement of sunflower according to the path of the sun |
| | Geotropism | <ul style="list-style-type: none"> Shoot: Negative geotropism Roots/Radicle of seed: Positive geotropism |
| | Hydrotropism | <ul style="list-style-type: none"> Shoot: Negative hydrotropism |
| | Chemotropism | Growth of pollen tubes towards ovules |
| | Thigmotropism | Growth of tendrils (modified leaves or stem) of the climbing plant |

Plant Movements: Types and their stimuli

Endocrine Glands in Animals: Types, functions, and secretions

| Endocrine Gland (Secrete Hormones in Blood) | | | |
|--|--|---|--|
| Gland | Target Organ/Cells | Secreted Hormone | Function |
| Pituitary Gland | Multiple organs | Growth hormone, TSH, etc. | Regulates growth, hormone production of different glands |
| Thyroid Gland (Malfunctioning can cause goiter) | Body cells | Thyroxin (Require iodine for production) | Regulates carbohydrate, protein, and fat metabolism |
| Adrenal Glands | Kidneys, muscles | Adrenaline, Non-Adrenaline | Manages stress responses during fight and flight reaction |
| Testes | Male Reproductive organs like external genitalia, etc | Testosterone | Development of secondary sexual characters in male like deep voice, beard, etc |
| Ovary | Female Reproductive organs like uterus, mammary gland, etc | Estrogen, Progesterone | Development of secondary sexual characters in female like mammary glands, menstrual cycle, maintenance of pregnancy. |
| Pancreas (Malfunctioning can cause diabetes) | Liver and muscle cells | Insulin, Glucagon | Regulates blood sugar levels |

| Function | Hormone | Site of Action | Example |
|----------------------|--------------------------------|------------------------------|---|
| Increase Cell Growth | Auxin | Tip of the shoot | Increases stem length, bends towards light |
| | Gibberellin | Stem | Growth of the stem length, seed germination |
| Inhibit Cell Growth | CBSE 2023 Cytokinins | Areas of rapid cell division | In fruits and seeds |
| | Abscisic Acid | Various parts of the plant | Wilted of leaves, closing of stomata |

Plant hormones: Functions and sites of action

Coordination in Plants

Hormones in Animals

Control and Coordination

Cheat Sheet

CBSE 2020

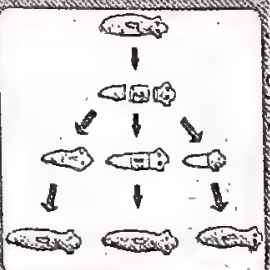
| Chemical Communication | Electrical Communication |
|--|--|
| Involves the release of hormones into the bloodstream to target organs | Utilises electrical signals (nerve impulses) to transmit information |
| Hormonal messages are generally slower and can take from several minutes to hours/days to exert their effect | Electrical signals are fast, allowing for immediate responses, often within milliseconds |
| Effects are usually longer-lasting and often widespread, affecting many cells throughout the body simultaneously | Effects are short-lived and highly localised, targeting specific cells or organs |

CHAPTER-7

HOW DO ORGANISMS REPRODUCE?

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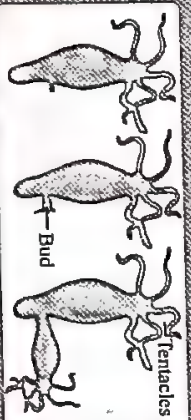
Process of replacing lost parts or developing a full organism from its body, e.g., *Hydra* and *Planaria*.



Regeneration in *Planaria*

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In this a new organism develops from an outgrowth or bud due to cell division at one particular site on the parent body, which then detaches to become a new, independent organism, e.g., *Hydra*.



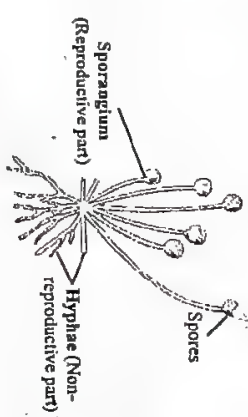
Budding in *Hydra*

Budding

Regeneration

CBSE 2024, 2022 Term-II

New individuals grow from spores, e.g., *Rhizopus*.



Spore Formation in *Rhizopus*

How do Organisms Reproduce?

(Asexual Reproduction)

Vegetative Propagation

Fragmentation

Fission



Do Organisms Create Exact Copies of Themselves?

- DNA copying during reproduction creates 'new cells' with their own apparatus, storing inheritance and protein information, with small variations.
- Variations from minor DNA copying errors help species adapt to environmental changes, ensuring survival (e.g., heat-resistant bacteria in warming waters).
- Variations drive evolution and support species' survival in changing ecosystems.

CBSE 2022 Term-II

Binary Fission

In this, single parent cell divides into two identical daughter cells

| Binary Fission in <i>Amoeba</i> | Binary Fission in <i>Leishmania</i> |
|---|---|
| Binary fission can occur in any plane, as <i>Amoeba</i> lacks a fixed axis of division, allowing for random orientation during cell division. | Binary fission occurs in a definite orientation due to the presence of a flagellum at one end of the cell, determining the plane of division. |
|  |  |

Splitting of unicellular organism or cell division where a single parent cell divides into two or more daughter cells.

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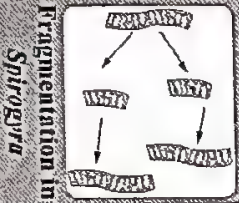
Multiple Fission

In this a single parent cell divides into multiple daughter cells simultaneously, after its nucleus undergoes multiple division.



Plasmodium
(Malaria parasite)

In simple multicellular organisms, main body get fragmented and fragments develop as new individuals, e.g., *Spirogyra*.



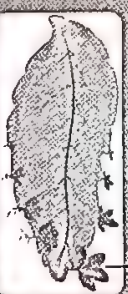
Fragmentation in *Spirogyra*

Advantages of Vegetative Propagation

- Accelerates flowering & fruiting in plants compared to seed-grown plants.
- Restoration of seedless plants, such as banana, rose, etc.
- Vegetatively propagated plants are genetically identical to their parent plants.

CBSE 2022 Term-II

Many plants in which parts like root, stem and leaves develop into new plants under appropriate conditions, e.g., Sugarcane, Roses, *Bryophyllum*.



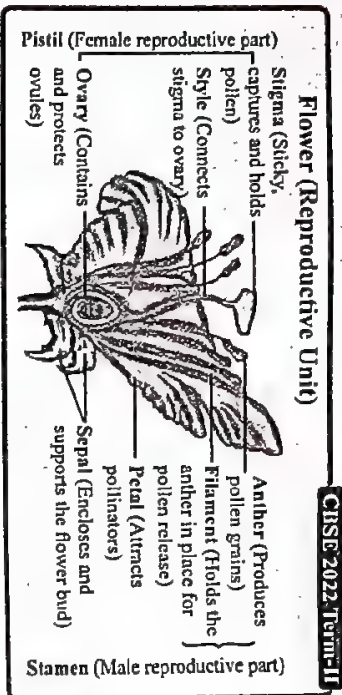
Leaf of *Bryophyllum* with Buds

CBSE 2023

Cheat Sheet



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- Type of Flowers**
- **Unisexual:** Either stamen or pistil are present in the same flower, e.g., Papaya, watermelon.
 - **Bisexual:** Both stamen and pistil are present in the same flower e.g., *Hibiscus*, mustard.

Self-pollination
 Transfer of pollen grains from anther to stigma of same flower or different flower but on same plant.

Cross-pollination
 Transfer of pollen grains from anther to stigma of the flower but on different plants.

Pollination
 Transfer of pollen grains to stigma.
 CBSE 2020

Pollinating agents
 Wind, water, insect, etc.

Significance of pollination:

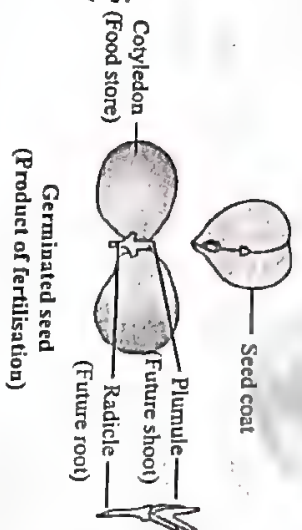
- Facilitates fertilisation by bringing male gametes to female counterparts.
- It allows genetic exchange, enhancing plant diversity.

How do Organisms Reproduce?

Sexual Reproduction in Plants

Post-Fertilisation Events

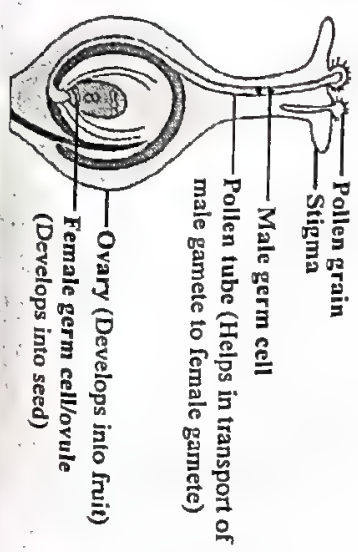
- **Zygote Development:** Zygote divides to form an embryo within the ovule.
- **Seed Formation:** Ovule develops a tough coat, converting into a seed containing the embryo.
- **Fruit Formation:** Ovary ripens to form fruit; petals, sepals, stamens, style, and stigma may fall off.
- **Germination:** Seed develops into a seedling under suitable conditions.



Fertilisation

- Pollen tube grow towards ovary.
- **Double fertilisation** → Zygote and endosperm formation.

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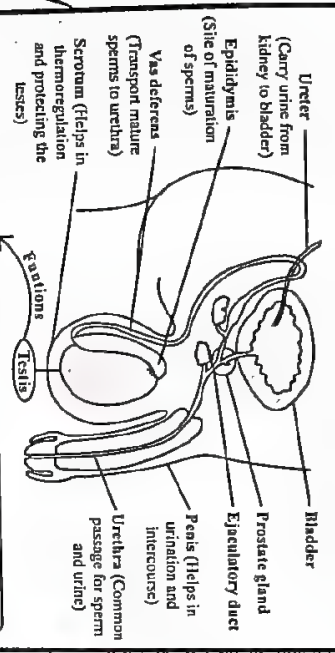
Advantage of Seed Formation
 Seeds ensure the survival of future plants by protecting the embryo and aiding dispersal for reproduction.

It is the phase when adolescents undergo physical changes, reaching sexual maturity and reproductive capability.

Pubertal Changes in Males vs. Females

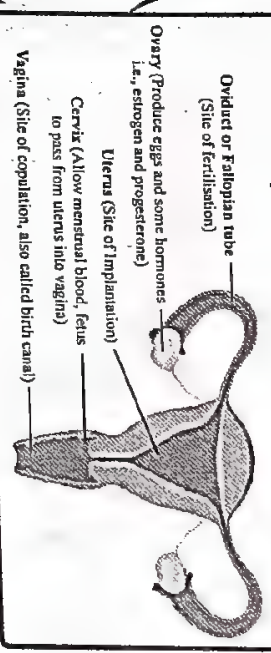
| Males | Females |
|---|---|
| Enlargement of male genitalia (testicles, penis) and muscles. | Breast development, widening of hips, growth of pubic hair. |
| Deepening of voice. | Voice remains higher-pitched. |
| Production of sperm begins. | Menstrual cycles start, ovulation occurs. |
| Broadening of shoulders, more muscular physique. | Widening of hips, more rounded body shape. |

Male Reproductive System: Structures and Functions



- Produce sperms and secrete testosterone
- Located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.

Female Reproductive System: Structures and Functions



| Sperm | Ovum |
|-------------------------------------|------------------------------|
| They are small in size | Comparatively large in size |
| Continuously produced after puberty | All eggs formed before birth |
| Highly motile | Non-motile |
| Produced in testes | Produced in ovaries |

Male gamete Vs. Female gamete

Fertilisation: Union of sperm and egg.

What happens if egg is not fertilised?

Development
Fertilisation → Zygote → Cleavage → Blastocyst → Implantation → Embryo Development
Placenta: A disc-like tissue present between uterine wall and developing embryo which provides nutrition to the fetus and help in waste removal.

Menstruation
The monthly cycle of shedding of uterus lining in the form of blood and mucus every month through vagina.

Sexual Reproduction in Animals

How do Organisms Reproduce?

Reproductive Health

Population size

The well-being in all aspects of reproduction.

The number of individuals present in a designated geographic range.

Factor that determine the size of a population are:

- Birth rate: Number of live births per thousand persons in a year.
- Death rate: Number of deaths per thousand persons in a year.

Concerns about an increasing population:

- Puts pressure on resources, making it difficult to raise everyone's standard of living.
- Leads to more environmental harm and uses up natural resources faster.

Contraceptive methods: Type and effects

| Type | Mechanism of Working | Example | Effects |
|---------------------------|--|---|---|
| Mechanical Barrier | Prevent sperm from reaching the egg | Condoms | Provides STD protection |
| Hormonal | Alters hormonal balance to prevent ovulation or fertilisation | Oral contraceptives (Pills) | May cause side effects |
| Intrauterine Device (IUD) | Creates an environment hostile to sperm and/or prevents implantation | Copper-T, loops | May cause uterine irritation and side effects |
| Surgical (Permanent) | Involves blocking the ducts responsible for transporting sperm or eggs | Vasectomy (male): Involves cutting or blocking the vas deferens. Tubectomy (female): Involves blocking or sealing the fallopian tubes. | Risk of infections and complications if not performed properly. |

Contraceptive Methods: Techniques or devices used to prevent pregnancy.

Sexually Transmitted Diseases (STDs): Infections transmitted through sexual contact.

| STDs: Agents and Name | Causative agent | Name of the STD |
|-----------------------|-----------------|-----------------|
| Bacteria | Gonorrhoea | |
| Syphilis | | |
| Virus | Genital Warts | |
| III/V/AIDS | | |

Sex Ratio Concerns

- Illegal sex-selective abortions of female fetuses harm the female-male sex ratio.
- Declining child sex ratio threatens societal health and balance.
- Prenatal sex determination is legally prohibited to prevent misuse.

CHAPTER-8

HEREDITY

Contrasting Characters Used by Mendel

| S. No. | Character | Trait | |
|--------|-----------------|----------|-------------|
| | | Dominant | Recessive |
| 1. | Stem height | Tall | Dwarf |
| 2. | Flower colour | Violet | White |
| 3. | Flower position | Axial | Terminal |
| 4. | Pod shape | Inflated | Constricted |
| 5. | Pod colour | Green | Yellow |
| 6. | Seed shape | Round | Wrinkled |
| 7. | Seed colour | Yellow | Green |

Mendel took pea plants with different characteristics (7 characters and 14 traits)

Law of Segregation: It states that alleles for a gene separate during gamete formation, ensuring each gamete carries one allele. Fertilization restores diploid alleles, inheriting one from each parent.

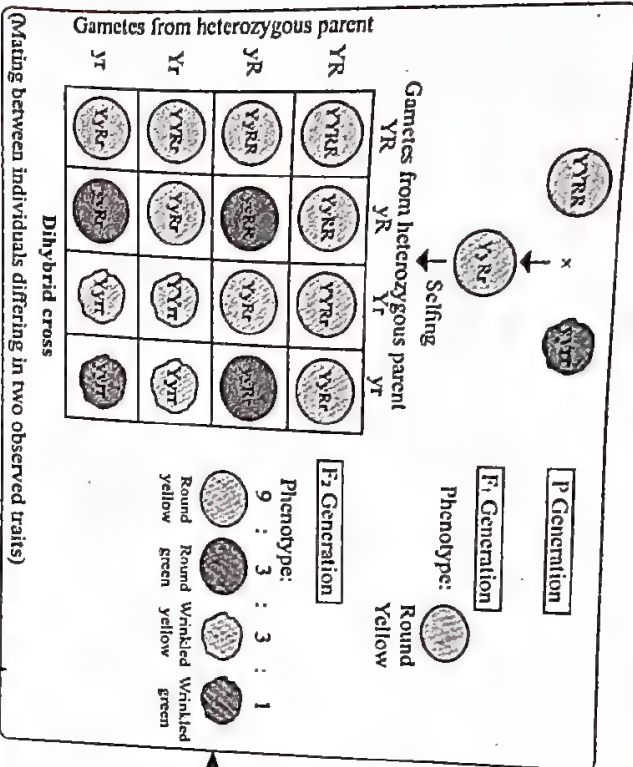
Mendel's Law of Inheritance

Law of Dominance: It states that dominant alleles mask recessive alleles, as seen in a monohybrid cross, where the F₁ generation displays only the dominant trait, e.g., tall stem height.

Law of Independent Assortment: It states that alleles from different genes segregate independently during gamete formation, demonstrated by a dihybrid cross like seed shape and color, showing no linkage.

Heredity (Transmission of traits from parents to offspring)

CBSF/2022/Term-II/2020



(Mating between individuals differing in two observed traits)

Inherited Trait

A characteristic that is passed from parents to offspring through genetic material, contributing to the offspring's phenotype.

DNA

- Carries the information source for making proteins in cells
- Minor inaccuracies during DNA copying produce variations

Chromosome

- Organized structures of DNA and proteins
- Sex chromosomes (XX and XY) determine the sex of an individual
- 22 pair of autosomes and 1 pair of sex chromosomes are present in humans

Gene

- A segment of DNA that controls characteristics or traits
- Determine specific traits through its expression

Dominant Trait Vs. Recessive Trait

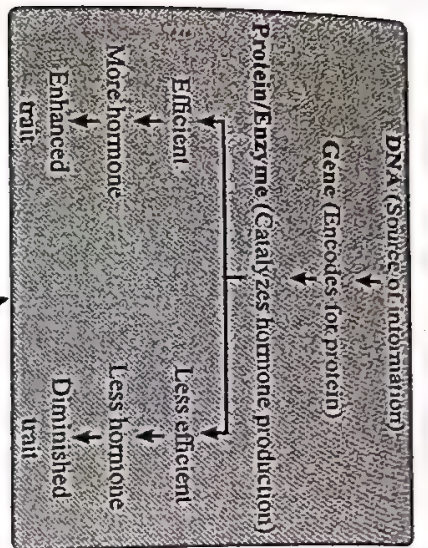
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| Aspect | Dominant Trait | Recessive Trait |
|--------------------------------------|---|---|
| Expression in offspring | Appears when at least one parent contributes the allele | Only appears when both parents contribute the allele |
| Visibility in heterozygous condition | Visible even if paired with a recessive allele | Hidden when paired with a dominant allele |
| Expression of the trait | Will be expressed if inherited | May not be expressed even if inherited |
| Example | Tall plant height (T) is dominant and expressed in TT or Tt | Short plant height (t) is recessive and expressed in tt |

Cheat Sheet



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- Inaccuracy in DNA copying mechanism: Small mistakes in DNA replication create new differences.
- Genetic recombination: Combining genes from two parents during sexual reproduction produces variety.

- Enhances species adaptability and survival in changing environments.
- Drives evolutionary processes through genetic diversity.
- Promotes the emergence of beneficial traits, aiding adaptation.

Variation (Differences among individuals within a species or population)

Causes of Variation

Importance of Variation

How do Traits get Expressed?

| X Chromosome Vs. Y Chromosome | | |
|-------------------------------|------------------------------------|-------------------------------------|
| Feature | X Chromosome | Y Chromosome |
| Size | Larger | Smaller |
| Role in Sex Determination | Common chromosome in both genders | Determines male gender |
| Inheritance | Can be inherited from both parents | Only inherited from the male parent |

Factors responsible for Sex Determination

Genetic Factor

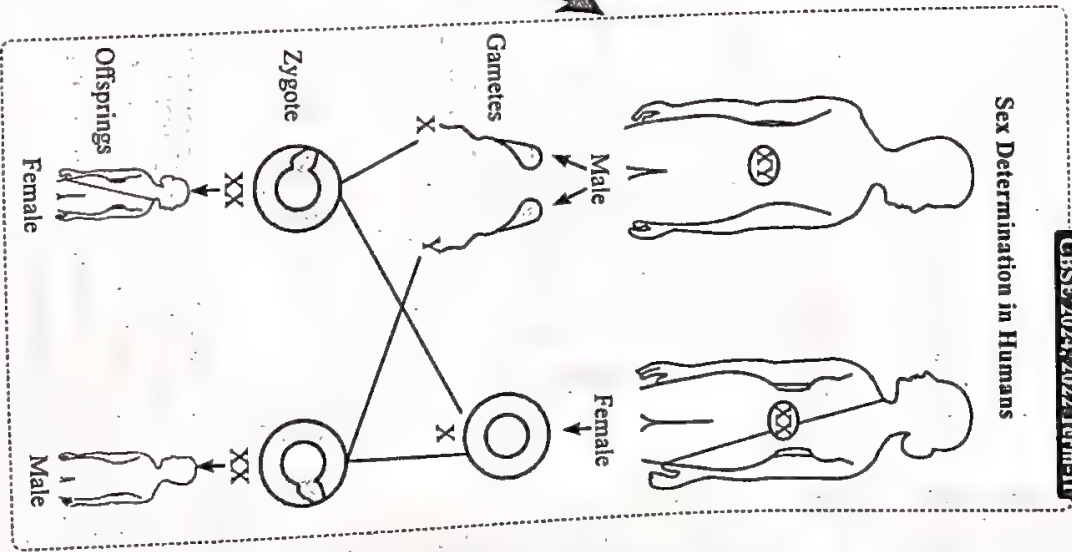
Environmental Factor

In some animals, the temperature at which the fertilized eggs are kept, decides the gender. E.g., in few reptiles (turtle)

Sex Determination
Process by which sexual phenotype of an individual is determined in a species.

In some animals like humans gender of an individual is determined by a pair of chromosomes called sex-chromosomes.

- XX - Female (Perfect pair of sex chromosome)
- XY - Male (Mismatched pair of sex chromosome)



CHAPTER-9

LIGHT - REFLECTION AND REFRACTION

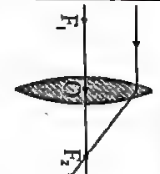
Concave lenses are thinner at the center and thicker at the edges.

They diverge light rays, causing parallel rays to spread out. Used in eyeglasses for nearsightedness (myopia). A concave lens always forms a virtual image.



They have a thicker center and thinner edges. Convex lenses converge light rays.

Used in cameras, telescopes, and glasses to correct farsightedness (hypermetropia). Produce virtual, upright images for objects beyond the focus.



Lens formula, Magnification and Power

Lens formula: $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$, where,

u = object distance, v = image distance

Magnification: $m = \frac{v}{u} = \frac{h_i}{h_o}$, where,

h_i = height of image, h_o = height of object

Power of lens: The reciprocal of focal length in meter is defined as power of lens. i.e.,

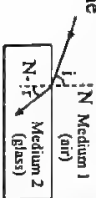
$$P = \frac{1}{f(\text{in m})} = \frac{100}{f(\text{in cm})}$$

S.I. Unit: Diopter (D), $1D = 1\text{m}^{-1}$

The phenomenon of bending of light at the surface of second medium, when light goes from one medium to another.

What are the Laws of Refraction?

1. Incident ray, refracted ray and normal to the surface lie in the same plane.
2. Snell's law: $\mu_1 \sin i = \mu_2 \sin r$



Mirror formula & Magnification

$$\text{Mirror formula: } \frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

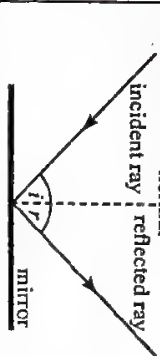
Where, u = object distance, v = image distance

$$\text{Magnification: } m = \frac{h_i}{h_o} = -\frac{v}{u}$$

Where, h_i = height of image, h_o = height of object

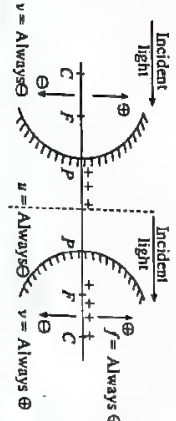
What are the Laws of Reflection?

1. Incident ray, reflected ray and the normal to the point of incident lie in the same plane
2. Angle of incident is equal to angle of reflection i.e. $\angle i = \angle r$



The bouncing back of light from any surface in the same medium is called Reflection of light.

Sign Convention for Mirror



LIGHT - REFLECTION AND REFRACTION

REFLECTION

REFRACTION

Types of Mirror

| Mirror | Shape of mirror | Nature of image | Magnification | Focal Length | Applications | Ray Diagram |
|------------------------------------|--|--|---|--------------|--|-------------|
| Plane Mirror | Flat and smooth reflecting surface | It forms a virtual, erect and laterally inverted image of an object placed in front of it. | Magnification = +1 | Infinity | solar cookers, periscopes, and scientific instruments for redirecting light, and enabling observation. | |
| Concave Mirror (Converging Mirror) | Reflecting surface that curves inward | It forms both real, inverted and virtual, erect image of an object | Magnification can be positive, negative, less than zero and more than zero. | Negative | Used in Torches, vehicles headlights, shaving mirrors. Large concave mirrors are used to concentrate sunlight to produce heat in solar furnaces. | |
| Convex Mirror (Diverging Mirror) | Reflecting surface that curves outward | It forms only virtual, erect and diminished images of an object. | Magnification is always positive and less than 1 | Positive | rear-view (wing) mirrors in vehicles offer safer driving by providing a wider field of view, always giving an erect image, and enabling drivers to see more traffic behind them. | |

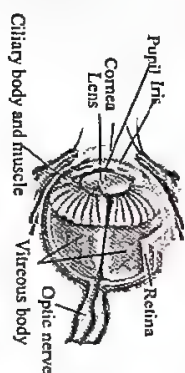
Cheat Sheet



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CHAPTER-10 THE HUMAN EYE AND THE COLOURFUL WORLD

The human eye is a sensory organ that responds to visible light and is a component of the sensory nervous system.



Accommodation of Eye

Ability of the eye lens to focus on nearby, and distant objects by changing their shape is called accommodation.

$$\text{Power of accommodation} = \frac{1}{\text{focal length (m)}} \\ (\text{SI Unit: Diopter (D)})$$

Presbyopia

Cause: (a) Hardening of the lens of your eye as you age
(b) Loss in flexibility of the eye lens

Correction: Glass of Bifocal Lens.

The upper component for distant vision and lower portion for reading.

Astigmatism

It is a common refractive error of the eye. It causes blurred or distorted vision due to an irregular shape in the cornea or lens.

- Symptoms include blurred vision at various distances, eye strain, and headaches.
- Correction options include glasses, contact lenses, or refractive surgery.

Cataract

Cataracts make the eye's lens cloudy, blurring vision, common in older age. Surgery is the usual fix: doctors remove the cloudy lens and replace it with a clear one. This surgery helps people see better.

What is Tyndall Effect?

The Tyndall effect, is the scattering of light by colloidal particles, distinguishing colloids from true solutions. When light passes through a colloid, it scatters due to particles, making the beam visible.

CBSE/2022

Light scattering is the dispersion of light in different directions when it interacts with particles or irregularities in a medium.

- Reddishness of the sun at sunrise and sunset
- Blue colour of the sky, are phenomena's of scattering of light.

Human eye and its structure

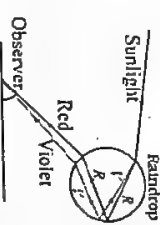
Light Scattering

Dispersion of Light

Defects & their Corrections

THE HUMAN EYE AND THE COLOURFUL WORLD

How is rainbow formed in nature?
The phenomena involved in the formation of a rainbow are dispersion, internal reflection and refraction.



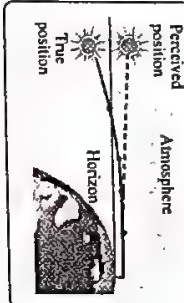
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It is the bending of light rays as they pass through the Earth's atmosphere.

CBSE/2024, 2023

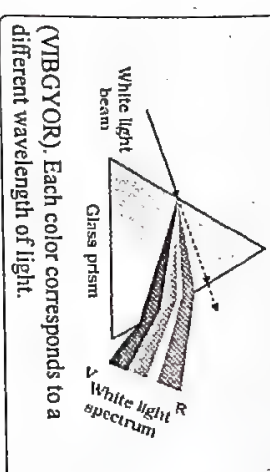
Advanced sunrise and delayed sunset

Due to atmospheric refraction, the sun seems to rise early by 2 minutes and set late by 2 minutes.



In Glass Prism

The colors of the spectrum include violet, indigo, blue, green, yellow, orange, and red



CBSE/2022

The phenomenon of splitting white light into its component colors is called dispersion.

| Defects | Causes | Correction | Diagram |
|---------------|---|-----------------------|---|
| Myopia | (a) Elongated Eyeball (b) Increased power of Crystalline lens | Glass of Concave lens | Diagram showing light rays focusing in front of the retina in a myopic eye. |
| Hypermetropia | (a) Compressed Eyeball (b) Decreased power of Crystalline lens | Glass of Convex Lens | Diagram showing light rays focusing behind the retina in a hypermetropic eye. |

Cheat Sheet

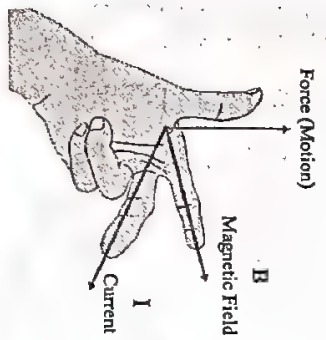


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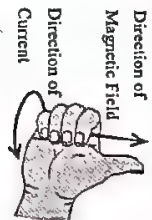
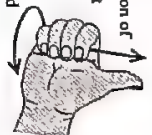
CHAPTER-12 MAGNETIC EFFECTS OF ELECTRIC CURRENT

When a current-carrying conductor is placed in a magnetic field, a force is exerted on the conductor. Its direction is given by,

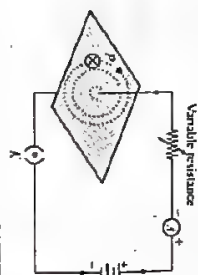
Fleming's Left-Hand Rule



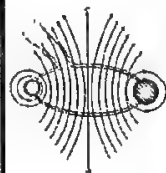
Right-Hand Thumb Rule
Straight current carrying conductor: Direction of Current



When a current is passed through a straight current-carrying conductor, a magnetic field is generated around it. The field lines are in the form of concentric circles at every point of the current-carrying conductor.



When a current passes through a circular loop, a magnetic field is generated around the loop. The direction of the magnetic field depends on the direction of the current.

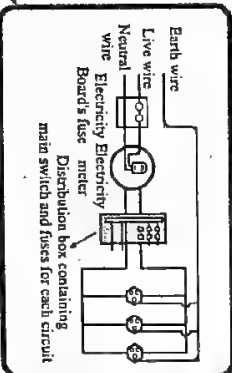


Who discovered the interconnection between electricity and magnetism?

Hans Christian Oersted, in 1820, had accidentally discovered that a compass needle got deflected when an electric current passed through a metallic wire placed nearby.

MAGNETIC EFFECT OF ELECTRIC CURRENT

Domestic electric circuit



What is a fuse?

Fuse is used for protecting the circuits due to short-circuiting or overloading of the circuits.

| | |
|----------------------|--|
| Live wire (red) | carries current to appliances. |
| Neutral wire (black) | returns current to the source. |
| Earth wire (green) | connected underground, ensures safety against electric shocks. |

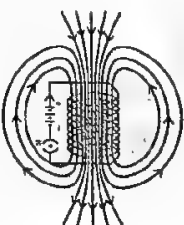
What is a magnetic field?

The region around a magnetic material or a moving electric charge within which the force of magnetism acts.

In our households, AC electric power of 220 V with a frequency of 50 Hz is supplied.

Magnetism is the force exerted by magnets when they attract or repel each other.

Solenoid is made up of coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder. The magnetic field inside a solenoid is uniform and parallel to its axis.

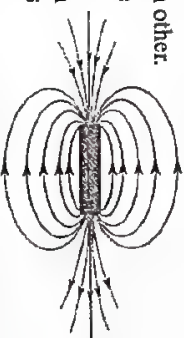


Electromagnetic Induction is a current produced because of voltage production due to a changing magnetic field.

An electromagnet is a type of magnet in which the magnetic field is produced by an electric current.

Properties of magnetic field lines for a bar magnet

1. Forms closed loops.
2. Never intersect with each other.
3. Crowded near the pole where the field is strong
4. Spread apart from each other where the field is weak.
5. Flow from the south pole to the north pole within a magnet and the north pole to the south pole outside.



Cheet Sheet



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CHAPTER-13

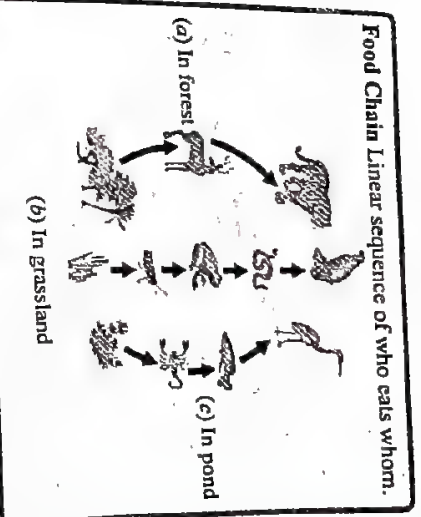
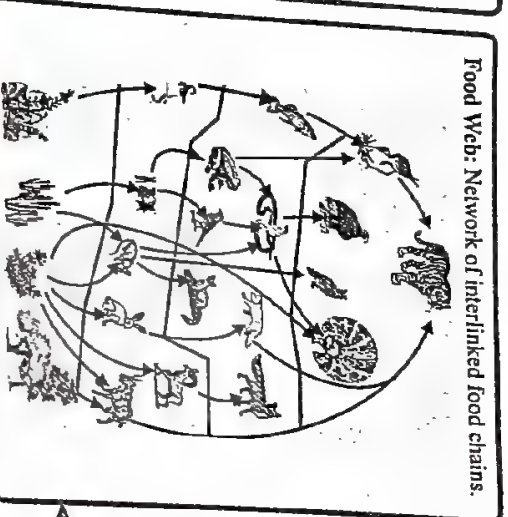
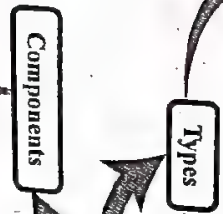
OUR ENVIRONMENT

Natural Ecosystem

- Result of interactions between organisms and the environment.
- Does not need human assistance, E.g., Forest, Pond and Lakes.

Artificial Ecosystem

- Human-made structures where biotic and abiotic components are made to interact with each other for survival, E.g., Garden, crop fields, aquarium.



Interaction among Biotic Components

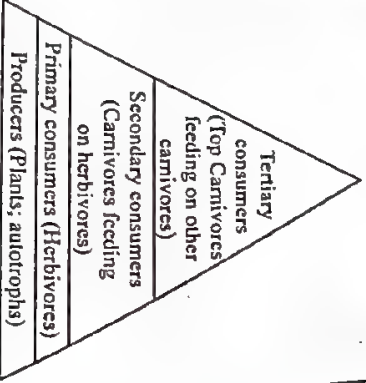
| Biotic | Abiotic |
|--|--------------------|
| Producers (Organisms that produce their own food through photosynthesis) | Temperature, Soil, |
| Consumers (Organisms that obtain energy by consuming other organisms) | Water, Minerals, |
| Decomposers (Organisms that break down dead or decaying materials) | Wind |

Components

Ecosystem

Our Environment

Trophic Levels



Why numbers of trophic levels limited?

- Loss of energy at each level
- Only 10% of energy entering a trophic level is transferred to the next.

Energy Transfer

- Unidirectional flow of energy:
 - Plants (Producers) → Herbivores (Primary consumers) → Carnivores (Secondary consumers) → Top Carnivores (Tertiary consumers).
- 10% law: Only 10% of energy entering a trophic level is transferred to the next.
- Biomagnification:
 - Increase in toxic substance concentration up the food chain.
 - Greater risks to organisms at higher trophic levels.

Environmental Problems

Waste

Biodegradable

Substances that are broken down by natural or biological processes, e.g., Paper, vegetables, food material, etc.

Non-Biodegradable

Substances that are not broken down by natural or biological processes, e.g., Plastic, Nylon, etc.

Ozone layer

Role: Protects the Earth's surface from harmful UV radiations.

Effects of its depletion: Skin cancer, cataract, etc.

Cause of its depletion: Synthetic chemicals like chlorofluorocarbons (CFCs)

Measures: In 1987, UNEP froze CFC production at 1986 levels and mandated CFC-free refrigerators worldwide.

Cheat Sheet



Most Probable Questions (Analyzed & Selected)

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Note: Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.

1. Chemical Reactions and Equations



In order to balance the above chemical equation, the values of x , y and z respectively are: (1 M) (2024, 2023)

- (a) 6, 2, 2 (b) 4, 1, 2
(c) 4, 2, 1 (d) 2, 2, 1

2. Which of the following statements about the reaction given below are correct?

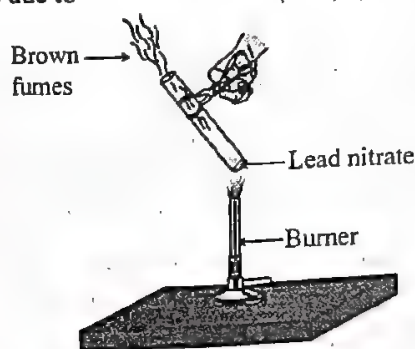


- (i) HCl is oxidized to Cl_2
(ii) MnO_2 is reduced to MnCl_2
(iii) MnCl_2 acts as an oxidizing agent
(iv) HCl acts as an oxidizing agent

(1 M) (2024, 2023, 2022, 2016)

- (a) (ii), (iii) and (iv) (b) (i), (ii) and (iii)
(c) (i) and (ii) only (d) (iii) and (iv) only

3. The emission of brown fumes in the given experimental set-up is due to (1 M) (2024, 2023, 2022)



- (a) thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide.
(b) thermal decomposition of lead nitrate which produces brown fumes of lead oxide.
(c) oxidation of lead nitrate forming lead oxide and nitrogen dioxide.
(d) oxidation of lead nitrate forming lead oxide and oxygen.

4. Assertion (A): Reaction of Quicklime with water is an exothermic reaction.

Reason (R): Quicklime reacts vigorously with water releasing a large amount of heat. (1 M) (2024, 2023, 2020)

Answer the question by selecting the appropriate option given below.

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

5. While studying the double displacement reaction, the solutions of barium chloride and sodium sulphate are mixed together.

- (i) What do you observe as soon as the two solutions are mixed together?
(ii) What will happen in the above observation made by you after ten minutes? (2 M) (2022, 2020, 2019, 2016)

6. (i) While electrolysis of water before passing the current some drops of an acid are added. Why? Name the gases liberated at cathode and anode. Write the relationship between the volume of gas collected at anode and the volume of gas collected at cathode.

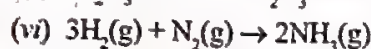
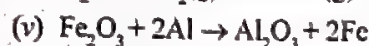
- (ii) What is observed when silver chloride is exposed to sunlight? Give the type of reaction involved.

(3 M) (2024, 2023)

7. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity. (3 M) (2024, 2020, 2019, 2018)

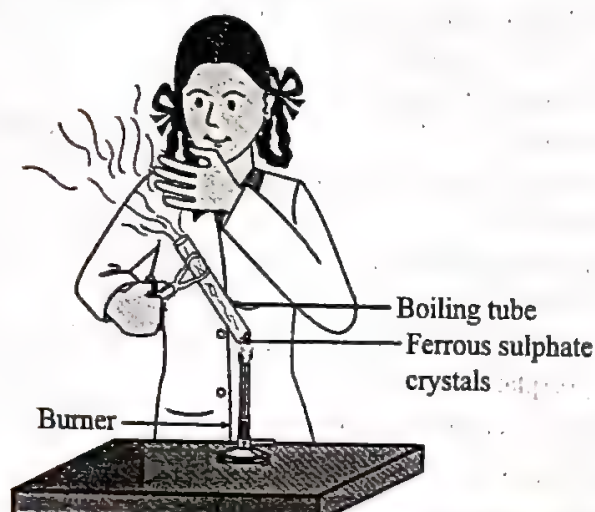
8. Select (i) combination reaction, (ii) decomposition reaction and (iii) displacement reaction from the following chemical equations: (3 M) (2023, 2022, 2019, 2015)

- (i) $\text{ZnCO}_3(\text{s}) \rightarrow \text{ZnO}(\text{s}) + \text{CO}_2(\text{g})$
(ii) $\text{Pb}(\text{s}) + \text{CuCl}_2(\text{aq}) \rightarrow \text{PbCl}_2(\text{aq}) + \text{Cu}(\text{s})$
(iii) $\text{NaBr}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgBr}(\text{s}) + \text{NaNO}_3(\text{aq})$



Competency Based Questions

9. During a chemistry experiment, Anjali heats ferrous sulphate crystals (FeSO_4) in a test tube. (1 M)



She observes the decomposition of ferrous sulphate into ferric oxide (Fe_2O_3) and two gases.

Which of the following correctly describes the observations related to the reactants and products in Anjali's experiment?

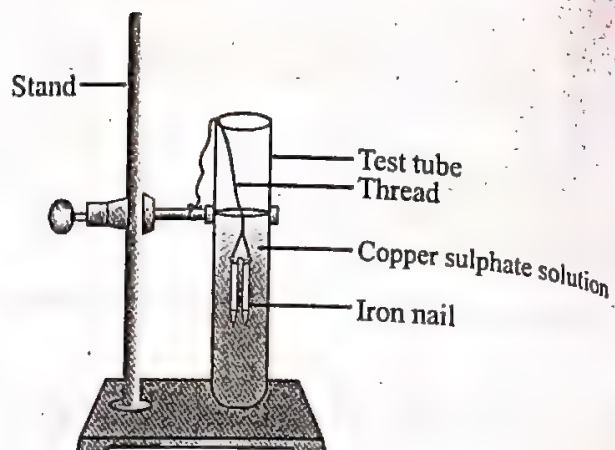
| | Type of change | Type of gas evolved |
|----|------------------------------------|---------------------------------|
| A. | Colour change from white to yellow | CO_2 |
| B. | Colour change from green to brown | SO_2 and SO_3 |
| C. | Colour change from white to grey | CO_2 |
| D. | No colour change | O_2 |

(a) A (b) B (c) C (d) D

10. During a school project, Ramesh prepared a solution of slaked lime by adding water to calcium oxide. He then used this solution for whitewashing the walls. After a few days, he noticed that the walls had developed a shiny finish.

Why did the walls develop a shiny finish a few days after Ramesh used slaked lime for whitewashing? Also, write the balanced chemical equation of the reaction. (2 M)

11. Raman is performing an experiment in his chemistry lab. He sets up an apparatus as shown in the diagram, where an iron nail is immersed in a copper sulphate solution. After some time, he observes certain changes in the solution and the iron nail. (4 M)



Observations:

- A. The blue colour of the copper sulphate solution fades.
B. A reddish-brown deposit forms on the iron nail.

Based on the experiment, answer the following questions.

- (i) What is the reddish-brown deposit formed on the iron nail?
(ii) Which of the following observations is correct for the above-given experimental diagram?
(1) Copper is oxidized to copper(II) oxide.
(2) Iron is oxidized to iron(III) sulphate.
(iii) In the reaction, which element transforms from its ionic form to metallic form?
(iv) Can we say that the element changes to ionic form, a reductant and more reactive? If yes, explain it.

Or

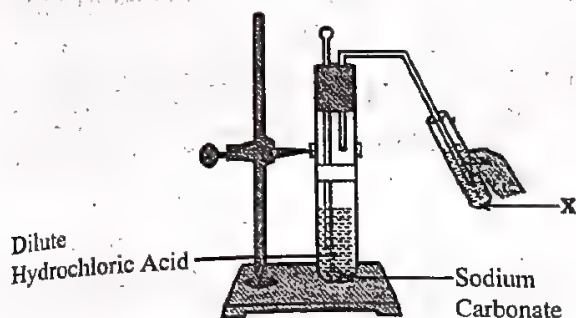
- (iv) What happens to the concentration of copper ions in the solution during the reaction?

2. Acids, Bases and Salts

1. The table below has information regarding pH and the nature (acidic/basic) of four different solutions. Which one of the options in the table is correct? (1 M) (2023, 2019)

| Option | Solution | Colour of pH paper | Approximate pH value | Nature of solution |
|--------|------------------|--------------------|----------------------|--------------------|
| (a) | Lemon juice | Orange | 3 | Basic |
| (b) | Milk of magnesia | Blue | 10 | Basic |
| (c) | Gastric juice | Red | 6 | Acidic |
| (d) | Pure water | Yellow | 7 | Neutral |

2. In the experimental setup given below, it is observed that on passing the gas produced in the reaction in the solution 'X' the solution 'X' first turns milky and then colourless. (1 M) (2023, 2022, 2019)



The option that justifies the above stated observation is that 'X' is aqueous calcium hydroxide and

- it turns milky due to carbon dioxide gas liberated in the reaction and after sometime it becomes colourless due to formation of calcium carbonate.
 - it turns milky due to formation of calcium carbonate and on passing excess of carbon dioxide it becomes colourless due to formation of calcium hydrogen carbonate which is soluble in water.
 - it turns milky due to passing of carbon dioxide through it. It turns colourless as on further passing carbon dioxide, sodium hydrogen carbonate is formed which is soluble in water.
 - the carbon dioxide liberated during the reaction turns lime water milky due to formation of calcium hydrogen carbonate and after some time it turns colourless due to formation of calcium carbonate which is soluble in water.
3. (i) A compound 'X' which is prepared from gypsum has the property of hardening when mixed with proper quantity of water.

Identify 'X' and write its chemical formula.

- State the difference in chemical composition between baking soda and baking powder:

(2 M) (2023, 2022, 2020, 2018)

4. During electrolysis of brine, a gas 'G' is liberated at anode. When this gas 'G' is passed through slaked lime, a compound 'C' is formed, which is used for disinfecting drinking water.

(i) Write formula of 'G' and 'C'.

(ii) State the chemical equation involved.

- What is common name of compound 'C'? Give its chemical name. (3 M) (2023, 2020, 2019, 2016)

5. (i) Suggest a safe procedure of diluting a strong concentrated acid.

- Name the salt formed when sulphuric acid is added to sodium hydroxide and write its pH.

- Dry HCl gas does not change the colour of dry blue litmus paper. Why? (3 M) (2023, 2019, 2015)

6. How is washing soda prepared from sodium carbonate? Give its chemical equation. State the type of this salt. Name the type of hardness of water which can be removed by it? (3 M) (2023, 2020)

7. Write the chemical composition of tooth enamel. Under what conditions of pH it starts corroding? Explain the reason of tooth decay and suggest one method to prevent it. (3 M) (2024, 2023)

8. Salts play a very important role in our daily life. Sodium chloride which is known as common salt is used almost in every kitchen. Baking soda is also a salt used in faster cooking as well as in baking industry. The family of salts is classified on the basis of cations and anions present in them.

(2024, 2023, 2022, 2019)

- Identify the acid and base from which Sodium chloride is formed. (1 M)

- Find the cation and the anion present in Calcium sulphate. (1 M)

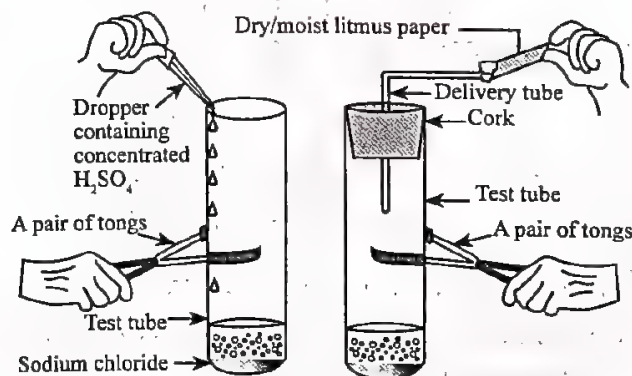
- "Sodium chloride and washing soda both belong to the same family of salts." Justify this statement. (2 M)

Or

- Define the term pH scale. Name the salt obtained by the reaction of Potassium hydroxide and Sulphuric acid and give the pH value of its aqueous solution. (2 M)

Competency Based Questions

9. During a chemistry lab session, you are tasked with investigating the properties of hydrogen chloride (HCl) gas under different conditions. You generate HCl gas by reacting sodium chloride (NaCl) with concentrated sulphuric acid (H_2SO_4). After producing the gas, you pass it through a delivery tube and test it with both dry and moist litmus paper. (1 M)



Based on this experiment, which of the following conclusions is correct?

- HCl gas exhibits acidic properties in both dry and moist conditions.
- HCl gas does not ionize in the absence of water, thus not showing acidic properties with dry blue litmus paper.
- HCl gas is basic in dry conditions and acidic in moist conditions.
- HCl gas turns moist red litmus paper blue.

10. Anita is conducting an experiment in her school laboratory to understand the neutralization reaction between an acid and a base. She starts with 15 mL of potassium hydroxide (KOH) solution and finds that it requires 10 mL of sulphuric acid (H_2SO_4) solution to neutralize it completely. To explore further, Anita decides to use 30 mL of the same potassium hydroxide solution for her next experiment.

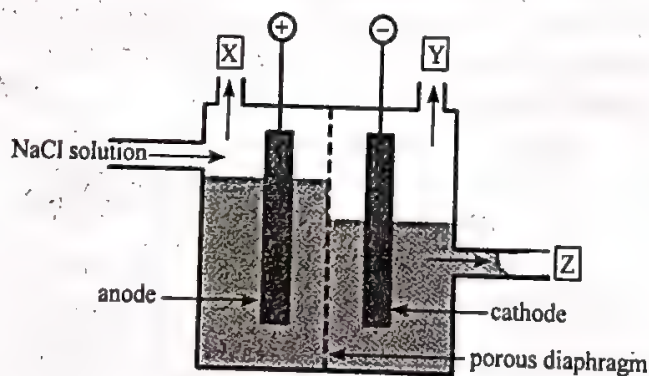
(2 M)

(A) Based on the results of her previous experiment, how much sulphuric acid solution (the same solution as before) should Anita use to ensure complete neutralization of the 30 mL potassium hydroxide solution? Explain your reasoning.

(B) Give the balanced chemical equation for the neutralization reaction between potassium hydroxide (KOH) and sulphuric acid (H_2SO_4).

11. Ashutosh is conducting an experiment. He observed that, when electricity is passed through an aqueous solution of a common salt, A substance 'Z' is produced along with the evolution of gases 'X' and 'Y'. When a burning matchstick is brought near the gas 'Y' it burns with a pop sound, whereas X is used for disinfecting drinking water. When gas 'X' is passed through a solution of slaked lime, an insoluble substance 'A' is produced.

(4 M)



- Write the name of gases 'X' and 'Y'.
- Write the balanced chemical equation for the formation of substance 'A'.

(iii) Write your observations:

- if a drop of blue litmus solution is added to the aqueous solution of substance 'Z'.
- if methyl orange is added to substance 'Z'.

Or

(iii) Write a balanced chemical reaction that takes place when 'X' and 'Y' react with each other. The product so produced will turn blue litmus red only when wet, why?

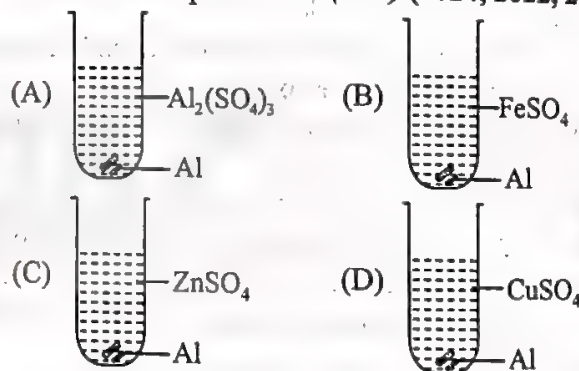
3. Metals and Non-metals

1. The oxide which can react with HCl as well as KOH to give corresponding salt and water is

(1 M) (2024, 2022, 2019)

- CuO
- Al_2O_3
- Na_2O
- K_2O

2. Mrignayani was doing the experiment of comparing reactivity of metals in the laboratory. She was given aluminium metal and was told to check reactivity by using four solutions as shown below. She would observe the reaction takes place in: (1 M) (2024, 2022, 2019, 2015)



- A and B
- B, C and D
- A, C and D
- C and D

3. A metal and a non-metal that exists in liquid state at room temperature are respectively:

(1 M) (2024, 2023, 2019)

- Bromine and Mercury
- Mercury and Iodine
- Mercury and Bromine
- Iodine and Mercury

4. Silver articles become black when kept in open for some time, whereas copper vessels lose their shiny brown surfaces and gain a green coat when kept in open. Name the substances present in air with which these metals react and write the name of the products formed.

(2 M) (2019, 2016, 2011)

5. Carbon cannot reduce the oxides of sodium, magnesium and aluminum to their respective metals. Why? Where are these metals placed in the reactivity series? How are these metals obtained from their ores? Take an example to explain the process of extraction along with chemical equations.

(5 M) (2020, 2011)

6. The metals produced by various reduction processes are not very pure. They contain impurities, which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining. (2024, 2018)

- What is the cathode and anode made of in the refining of copper by this process? (1 M)
- Name the solution used in the above process and write its formula. (1 M)
- (A) How copper gets refined when electric current is passed in the electrolytic cell? (2 M)

Or

- (B) You have two beakers 'A' and 'B' containing copper sulphate solution. What would you observe after about 2 hours if you dip a strip of zinc in beaker 'A' and a strip of silver in beaker 'B'? Give reason for your observations in each case. (2 M)

7. Almost all metals combine with oxygen to form metal oxides. Metal oxides are generally basic in nature. But some metal oxides show both basic as well as acidic behaviour. Different metals show different reactivities towards oxygen. Some react vigorously while some do not react at all. (2023, 2022, 2020, 2019)

- What happens when copper is heated in air? (Give the equation of the reaction involved). (1 M)
- Why are some metal oxides categorized as amphoteric? Give one example. (1 M)
- Complete the following equations: (2 M)
 - $\text{Na}_2\text{O}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$
 - $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow$

Or

- On burning Sulphur in oxygen a colourless gas is produced. (2 M)
 - Write chemical equation for the reaction.
 - Name the gas formed.
 - State the nature of the gas.
 - What will be the action of this on a dry litmus paper?

8. The melting points and boiling points of some ionic compounds are given below: (2023, 2022, 2020)

| Compound | Melting Point (K) | Boiling Point (K) |
|-----------------|-------------------|-------------------|
| NaCl | 1074 | 1686 |
| LiCl | 887 | 1600 |
| CaCl_2 | 1045 | 1900 |
| CaO | 2850 | 3120 |
| MgCl_2 | 981 | 1685 |

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.

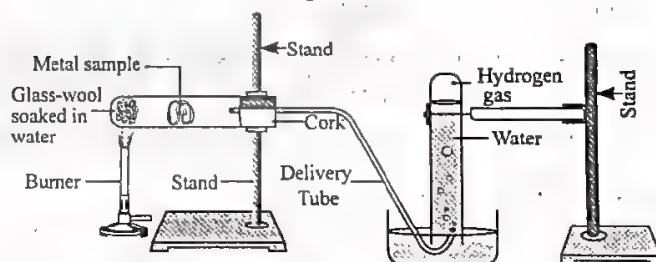
- Show the electron transfer in the formation of magnesium chloride. (1 M)
- List two properties of ionic compounds other than their high melting and boiling points. (1 M)
- (A) While forming an ionic compound, say sodium chloride, how does sodium atom attain its stable configuration? (2 M)

Or

- (B) Give reasons: (2 M)
 - Why do ionic compounds in the solid state not conduct electricity?
 - What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride?

Competency Based Questions

9. In a laboratory experiment, to study the action of steam on different metals, the setup is as shown in the image.



Action of steam on a metal

A metal sample is heated using a burner, and steam is passed over the metal. The resulting reaction is observed by collecting any gas produced in an inverted test tube over water.

Which of the following metals, when used as the metal sample in the experiment, will not liberate hydrogen gas? (1 M)

- Aluminium (Al)
- Zinc (Zn)
- Iron (Fe)
- Lead (Pb)

10. Consider the table given below: (3 M)

| Metal | Magnesium chloride | Aluminium nitrate | Iron(III) chloride | Lead nitrate |
|-------|--------------------|-------------------|--------------------|--------------|
| P | No reaction | No reaction | Displacement | Displacement |
| Q | No reaction | No reaction | No reaction | Displacement |
| R | No reaction | Displacement | Displacement | Displacement |
| S | No reaction | No reaction | No reaction | No reaction |

(A) Imagine you are a metallurgist working in a laboratory. You have four metal samples labelled P, Q, R, and S. You need to determine which metal is the most reactive to ensure safe handling and storage procedures. Using the data provided in the table, analyse the reactivity of each metal and identify the most reactive one. Explain your reasoning.

(B) You are tasked with creating a safety protocol for storing metals in a chemical warehouse. To prevent any hazardous reactions, you need to list the metals P, Q, R, and S in order of their reactivity, from most reactive to least reactive. Based on the experimental data provided, arrange the metals accordingly.

(C) If Metal Q displaces lead from lead nitrate but does not react with aluminium nitrate, what can be inferred about the relative reactivity of Metal Q compared to aluminium and lead?

11. You are working as a metallurgist in a lab where you are tasked with studying the reactivity and extraction processes of various metals. During one of your experiments, you obtain a red-brown metal oxide (Y) from its anhydrous sulphate salt by heating. You then react this oxide with a metal (X), whose oxide is known to be amphoteric. The reaction results in the reduction of the metal oxide (Y) to metal (A). (4 M)

(i) Based on the reactivity series of metals, identify the likely positions of metals X and A in the series (top, middle, or bottom). Provide a justification for your answer.

(ii) Write the chemical reaction between metal oxide (Y) and metal (X). Additionally, explain a practical application of this type of reaction in the field of metallurgy.

Or

(ii) Describe the colour change you would expect to observe during the reaction between metal oxide (Y) and metal (X). Provide an explanation for the observed colour change.

4. Carbon and its Compounds

1. A student took four test tubes P, Q, R and S and filled about 8 mL of distilled water in each. After that he dissolved an equal amount of Na_2SO_4 in P, K_2SO_4 in Q, CaSO_4 in R and MgSO_4 in S. On adding an equal amount of soap solution and shaking each test tube well, a good amount of lather will be obtained in the test tubes:

(1 M) (2019, 2017, 2016, 2015)

(a) P and Q
(c) P, Q and S

(b) P and R
(d) Q, R and S

2. A gas is liberated immediately with a brisk effervescence, when you add acetic acid to sodium hydrogen carbonate powder in a test tube. Name the gas and describe the test that confirms the identity of the gas.

(2 M) (2019, 2017, 2016, 2015)

3. (a) Why are most carbon compounds poor conductors of electricity?

(b) Write the name and structure of a saturated compound in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound.

(3 M) (2024, 2019, 2018)

4. (a) Draw the electron dot structure for ethyne.

(b) List two differences between the properties exhibited by covalent compounds and ionic compounds.

(3 M) (2023, 2022, 2019, 2015)

5. Distinguish between esterification and saponification reactions with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process.

(3 M) (2023, 2017, 2016)

6. (a) A saturated organic compound 'A' belongs to the homologous series of alcohols.

On heating 'A' with concentrated sulphuric acid at 443 K, it forms an unsaturated compound 'B' with molecular mass 28u.

The compound B on addition of one mole of hydrogen in the presence of Nickel, changes to a saturated hydrocarbon 'C'.

(i) Identify A, B and C.

(ii) Write the chemical equations showing the conversion of A into B.

(iii) What happens when compound C undergoes combustion?

(iv) State one industrial application of hydrogenation reaction.

(v) Name the products formed when compound reacts with sodium.

(5 M) (2023, 2020, 2019, 2018, 2017)

7. (a) (i) Give reason why carbon can neither form C^{4+} cation nor C^{4-} anions but form covalent compounds.

(ii) What is homologous series of carbon compounds? Write the molecular formula of any two consecutive members of homologous series of aldehydes.

(iii) Draw the structure of the molecule of cyclohexane (C_6H_{12}).

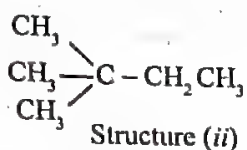
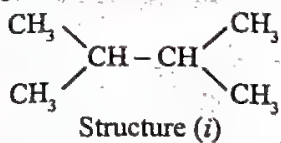
(5 M) (2024, 2022, 2021)

8. (i) Draw the structure of the following compounds:

(a) Butanoic acid

(b) Chloropentane

- (ii) How are structure (i) and structure (ii) given below related to one another? Give reason to justify your answer.



Draw one more possible structure for above case.

- (iii) Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula.

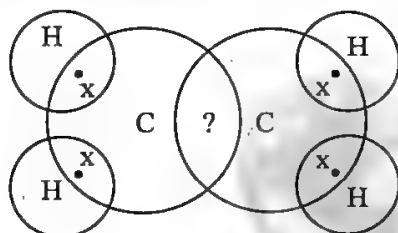
(5 M) (2023, 2016)

9. Soaps and detergents are both types of salts. State the difference between the two. Write the mechanism of the cleansing action of soaps. Why do soaps not form lather (foam) with hard water? Mention any two problems that arise due to the use of detergents instead of soaps.

(5 M) (2023, 2020, 2017, 2015)

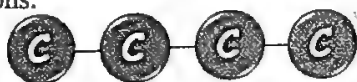
Competency Based Questions

10. In the given electron dot structure of ethene, how many pairs of electrons are shared between the two carbon atoms? (1 M)



- (a) 4 (b) 1 (c) 2 (d) 3

11. You are studying the properties and structures of hydrocarbons in your chemistry lab. You are given two tasks based on the four-carbon skeleton of straight-chain hydrocarbons. (3 M)



Task 1: You are asked to analyse a four-carbon skeleton of a straight-chain alkene.

- (A) Draw the structures of all possible compounds with this skeleton.

Task 2: You are also asked to analyse a four-carbon skeleton of a straight-chain alkyne.

- (B) Answer the following questions based on this skeleton:

- (i) How many carbon atoms may NOT be bonded to any hydrogen atoms?
(ii) How many hydrogen atoms will there be in the compound?

12. During a chemistry quiz, John and Emma are given a series of hints by the quiz master to identify substances and chemical reactions. They must use their knowledge of organic chemistry to solve the questions. (4 M)

| S. No. | HINT |
|--------|--|
| 1. | Substance 'C' is used as a preservative |
| 2. | 'C' has two carbon atoms; 'C' is obtained by the reaction of 'A' in presence of alkaline Potassium permanganate followed by acidification. |
| 3. | Misuse of 'A' in industries is prevented by adding Methanol, Benzene, and pyridine to 'A'. |
| 4. | 'F' is formed on heating 'A' in presence of conc. Sulphuric acid. |
| 5. | 'F' reacts with Hydrogen gas in presence of Nickel and Palladium catalyst to give compound 'Z'. |

Based on the above hints, answer the following questions.

- (i) Give the IUPAC names of A and F.
(ii) Illustrate with the help of chemical equations the changes taking place. ($A \rightarrow C$ and $A \rightarrow F$)
Or
(ii) Name the chemical reactions which occur in steps 2 and 5.
Identify the compounds formed in these steps if 'A' is replaced with its next homologue.

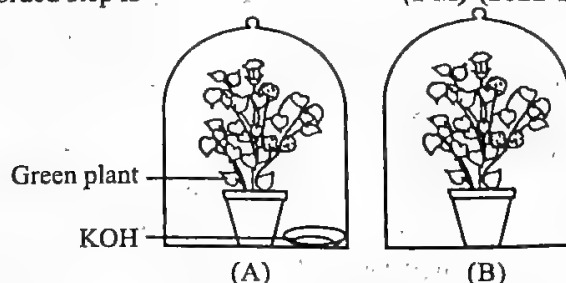
5. Life Processes

1. Opening and closing of stomata is due to:

(1 M) (2024, 2023, 2022, 2020)

- (a) High pressure of gases inside the cells.
(b) Movement of water in and out of the guard cells.
(c) Stimulus of light in the guard cells.
(d) Diffusion of CO_2 in and out of the guard cells.

2. A student was asked to write a stepwise procedure to demonstrate that carbon dioxide is necessary for photosynthesis. He wrote the following steps. The wrongly worded step is (1 M) (2022 Term I)



- (a) Both potted plants are kept in dark room for at least three days.
(b) Bottom of the bell jars is sealed to make them air tight.

(c) Both potted plants are kept in sunlight after the starch test.

(d) A leaf from both the plants is taken to test the presence of starch.

3. (a) State the role played by the following in the process of digestion.

(i) Enzyme trypsin (ii) Enzyme lipase

(b) List two functions of finger-like projections present in the small intestine. (3 M) (2024, 2020)

4. (i) Why is respiratory pigment needed in multicellular organisms with large body size? (1 M)

(ii) Give reasons for the following: (2 M) (2024)

(a) Rings of cartilage are present in the throat.

(b) Lungs always contain a residual volume of air.

(c) The diaphragm flattens and ribs are lifted up when we breathe in.

(d) Walls of alveoli contain an extensive network of blood vessels.

5. Mention the pathway of urine starting from the organ of its formation. Name four substances which are re-absorbed from the initial filtrate in the tubular part of the nephron. (3 M) (2016)

6. (i) What is double circulation?

(ii) Why is the separation of the right side and the left side of the heart useful? How does it help birds and mammals? (3 M) (2023)

7. (a) Why is there a difference in the rate of breathing between aquatic organisms and terrestrial organisms? Explain.

(b) Draw a diagram of human respiratory system and label-pharynx, trachea, lungs, diaphragm and alveolar sac on it. (5 M) (2020, 2015, 2014)

8. (a) Write the correct sequence of steps followed during journey of oxygen rich blood from lungs to various organs of human body.

(b) What happens when the system of blood vessels develop a leak? (5 M) (2020)

9. (a) Mention any two components of blood.

(b) Trace the movement of oxygenated blood in the body.

(c) Write the function of valves present in between atria and ventricles.

(d) Write one structural difference between the composition of artery and veins. (5 M) (2018, 2016)

10. (i) Name the process and explain the type of nutrition found in green plants. List the raw materials required for this process. Give chemical equation for the mentioned process.

(ii) Write three events that occur during this process.

(5 M) (2018)

Competency Based Questions

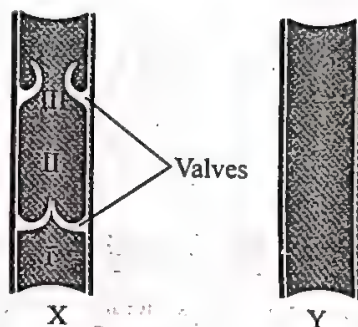
11. We often hear people complain about 'acidity' in the stomach. (3 M) (CFPQ)

(a) Overproduction of what substance is most likely the reason for the complaint?

(b) Why is the production of this substance necessary?

(c) How does the stomach prevent itself from the harmful effects of overproduction of the substance?

12. Given below are the two different types of blood vessels X and Y. (5 M)



Based on your observation, answer the following questions:

(a) Identify X and Y.

(b) In what direction does blood flow in X? Do you think blood will flow from I to II? Give reason for your answer.

(c) What is the function of X and Y found in the circulatory system of our body?

(d) Write the structural differences between X and Y.

13. Ananya is studying the process of photosynthesis using variegated leaves. She performs an experiment where she keeps a plant having variegated leaves in the dark for three days and then exposes it to sunlight for six hours. She then performs a starch test on the leaf, which reveals a different color in various parts of the leaf as shown below: (4 M)

Before starch test

After starch test



(a)



(b)

represents green

represents blue-black

(i) Ananya observes that only the green areas of the variegated leaf turn blue-black after the starch test. What conclusion can she draw from this observation?

- (ii) (A) If Ananya repeated the experiment with a leaf that had no green areas, what result would she expect from the starch test?

Or

- (ii) (B) What reagent is used in the starch test to detect the presence of starch in the leaf?
- (iii) Ananya notices that a portion of the leaf, if covered with black paper during the sunlight exposure, did not turn blue-black after the starch test. What does this indicate?

6. Control and Coordination

1. Name the part of brain which is responsible for the following actions: (2 M) (2023, 2015)

- (i) Maintaining posture and balance
- (ii) Beating of heart
- (iii) Thinking
- (iv) Blood pressure

2. Define reflex action. With the help of a flow chart show the path of a reflex action such as sneezing.

(3 M) (2024, 2023, 2019, 2015)

3. A squirrel is in a scary situation. Its body has to prepare for either fighting or running away. State the immediate changes that take place in its body so that the squirrel is able to either fight or run? (3 M) (2020)

4. Why is chemical communication better than electrical impulses as a means of communication between cells in a multi-cellular organism? (3 M) (2020)

5. Dr. Suman Lakhera is treating two patients:

Patient 1: Suffering from a digestive disorder, affecting enzyme secretion necessary for carbohydrate, fat, and sugar metabolism.

Patient 2: Suffering with anxiety issues.

Based on your understanding, answer the following question: (2 M)

- (a) Name the concerned gland in the case of Patient 1.
- (b) Name the concerned gland in the case of Patient 2 and state one of its functions.

6. What are plant hormones? Name the plant hormones responsible for the following: (3 M) (2019, 2016)

- (i) Growth of stem
- (ii) Promotion of cell division

(iii) Inhibition of growth

(iv) Elongation of cells

7. (a) Draw the structure of a neuron and label the following on it: (5 M) (2016)

- (i) Dendrite
- (ii) Cell body
- (iii) Nucleus
- (iv) Axon

- (b) Name the parts of a neuron:

- (i) Where information is acquired.
- (ii) Through which information travels as an electrical impulse.
- (iii) Where this impulse must be converted into a chemical signal for onward transmission.

- (c) Define neuromuscular junction.

8. (a) Why is the use of iodised salt advisable? Name the disease caused due to deficiency of iodine in our diet and state its one symptom.

- (b) How do nerve impulses travel in the body? Explain. (5 M) (2019)

9. Define geotropism. Draw a labelled diagram of a plant showing geotropic movements of its parts. (5 M) (2020)

10. A group of students conducted an experiment to understand the effects of phototropism in plants. They placed a potted plant in a black box with a single small hole on one side to allow light in. After a week, they observed that the plant's stem bent in the same direction. Based on this scenario answer the following questions: (2 M)

- (a) Describe the mechanism behind the bending of the plant's stem.

- (b) Name the plant hormone involved in this process and explain its role in the bending of the stem.

Competency Based Questions

11. Akansha smelled imli at a food corner, her mouth started to water. Which of the following sequences best describes the actions taking place in Akansha's body in response to the smell? (1 M)

(a) Gustatory receptors at nose detect the smell of imli → Olfactory signals sent to the cerebellum → Activation of salivary glands

(b) Olfactory receptors at the nose detect the smell of imli → Signals received by forebrain → then to medulla oblongata → Activation of salivary glands

(c) Gustatory receptors at the nose detect the smell of imli → Olfactory signals sent to the spinal cord → Generate reflex action → Activation of salivary glands

(d) Olfactory receptors at the nose detect the smell of imli → Signals processed by the pituitary → Send stimulus → Activation of the salivary glands

12. A gardener observed two different types of plant responses in her garden, as shown in images A and B. Based on your understanding, answer the following questions: (3 M)



A

B

- What is the similarity in the responses of the plants shown in images A and B?
- Explain the ecological significance of the plant response observed in image A.
- Describe the physiological mechanism underlying the plant response observed in image B.

13. Body responses to stimuli involves specific brain regions. The table below summarizes various responses, their voluntary or involuntary nature and their associated brain regions (P, Q, S, T): (4 M)

| Responses | Type of response | Brain region involved |
|----------------------------|------------------|-----------------------|
| Pupil constriction | Involuntary | P |
| Walking in a straight line | Voluntary | Q |
| Salivation | R | S |
| Cycling | Voluntary | T |

- Many of the involuntary responses like pupil constriction and salivation are controlled by which part of the brain?
- According to the table, which response(s) is/are associated with the cerebellum? In which category (voluntary or involuntary) would you place the response "salivation"?
- (A) T is a component of which part of the brain? Write another component of that part of the brain and its function.

Or

- (B) Analyze how the involvement of brain region T in cycling contrasts with the roles of other brain regions like P and S.

7. How do Organisms Reproduce?

- The number of chromosomes in parents and offsprings of a particular species undergoing sexual reproduction remain constant due to: (1 M) (2023)
 - doubling of chromosomes after zygote formation.
 - halving of chromosomes after zygote formation.

- doubling of chromosomes before gamete formation.
- halving of chromosomes at the time of gamete formation.

- Mention the functions of (a) Placenta (b) Fallopian tubes (c) Uterus and (d) Ovary in the human female reproductive system. (2 M) (2022)
- (a) Differentiate between binary fission in *Amoeba* and binary fission in *Leishmania*. (b) How does reproduction take place in malarial parasite? (2 M) (2022)

- What are the functions of testis in the human male reproductive system? Why are these located outside the abdominal cavity? Who is responsible for bringing about changes in appearance seen in boys at the time of puberty? (3 M) (2016)

- Define the term pollination. Differentiate between self pollination and cross pollination. What is the significance of pollination? (3 M) (2020, 2019)

- (i) Name and explain the two modes of asexual reproduction observed in hydra.

- What is vegetative propagation? List two advantages of using this technique. (5 M) (2024, 2023, 2022)

- (i) Name three techniques/devices used by human female to avoid pregnancy. Mention the side effects caused by each.

- What will happen if in a human female (a) fertilisation takes place, (b) an egg is not fertilised? (5 M) (2024, 2023, 2017)

- (a) Draw a diagram to show spore formation in *Rhizopus* (b) With the help of an example differentiate between the process of Budding and Fragmentation.

- Why is vegetative propagation practiced for growing some type's of plants? (5 M) (2020)

- (a) Draw a diagram showing germination of pollen on stigma of a flower and mark on it the following organs/parts:

(i) Pollen Grain

(ii) Pollen tube

(iii) Stigma

(iv) Female germ cell

- State the significance of pollen tube.

- Name the parts of flower that develop after fertilization into

(i) Seed

(ii) Fruit

(5 M) (2022, 2020, 2015)

- Given below are certain situations. Analyze and describe its possible impact on a person:

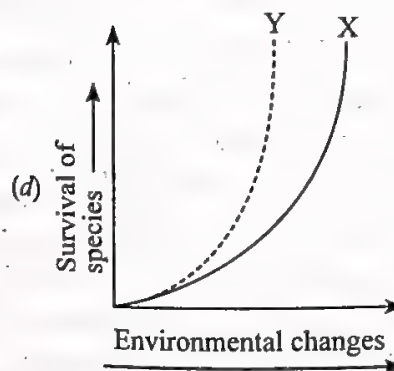
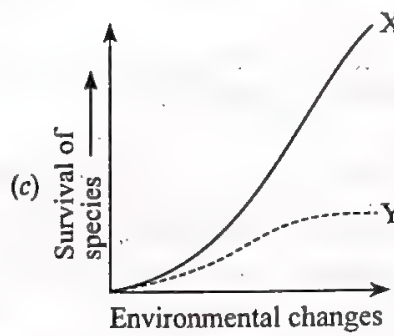
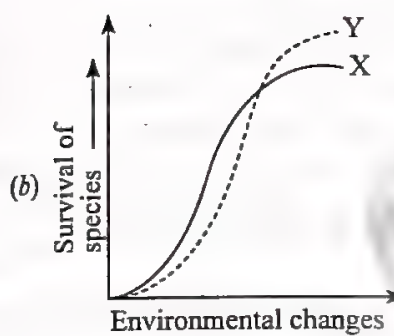
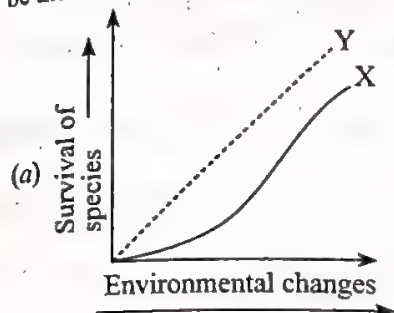
- Testes of a male boy are not able to descend into scrotum during his embryonic development.

- (b) Vas deferens of a man is plugged.
 (c) Prostate and seminal vesicles are not functional.
 (d) Egg is not fertilised in a human female.
 (e) Placenta does not attach to the uterus optimally.

(5 M) (CBSE APQ, 2023)

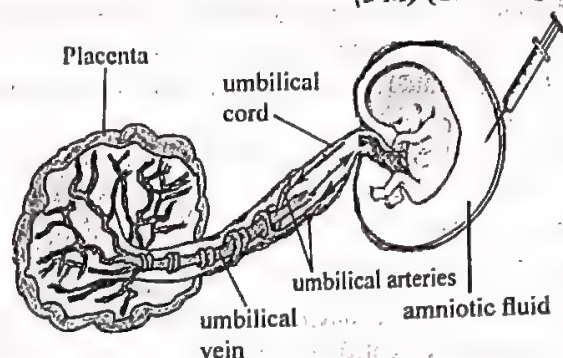
Competency Based Questions

11. If you were asked to plot a graph comparing the ability of asexual (Y) and sexual (X) organisms to survive in a changing environment, which of the given graphs would be the most accurate representation? (1 M)



12. The image below shows a developing fetus in the mother's womb. The developing fetus is connected to the placenta by means of umbilical cord. The Umbilical vein and artery run inside the umbilical cord.

(3 M) (CBSE SQP, 2024)



- Name two substance that moves through the blood vessels.
- If the placenta has less villi how will it affect the baby's growth?
- Name the region where the embryo develops inside the female body. Explain how this region is adapted for nourishing the baby.
- Some of the fetal cells fall off into the amniotic fluid and can be collected by careful procedure. The cells were screened and found to contain XY chromosome.
 - What is the sex of the foetus?
 - How is this prenatal sex determination misused?

13. Consider the following three flowers, namely X, Y and Z. The development of a flower into a fruit depends on the presence of certain reproductive structures. Study the diagram provided and answer the following questions:

(4 M)

| Flower X | Flower Y | Flower Z |
|----------|----------|----------|
| | | |

- What essential reproductive structure must be present in a flower for it to develop into a fruit?
- Based on the diagrams, which flower(s) contain the reproductive structure necessary for fruit development?
- (A) Explain why the other flower(s) will not develop into a fruit.

Or

- (B) Describe the process that leads to the development of a fruit from a flower.

8. Heredity

1. **Assertion (A):** Traits like eye colour or height are inherited traits.

Reason (R): Inherited traits are not transferred from parents to young ones. (1 M)

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true, but R is false.
- (d) A is false, but R is true.

2. If two pea plants having round and green seeds ($RRGg$) are crossed, identify the percentage of the following with respect to the F_1 generation: (3 M) (CBSE APQ, 2023)

- (a) gametes having both the round and yellow seed traits
- (b) offspring having the same genotype as the parents
- (c) offspring having the same phenotype as the parents

3. (a) In a family of four individuals, the father possessed long ears and the mother possessed short ears. If the parents had pure dominant and recessive traits respectively, then calculate the ratio of genetic makeup of F_2 generation. Show a suitable cross.

(b) If father had short ears and the mother had long ears, explain what effect it will have on the ratio of genetic makeup in F_2 generation. (2 M) (CBSE SQP, 2024)

4. In a cross between red coloured and white coloured flowers, when plants with red coloured flowers of F_1 generation were self pollinated, plants of F_2 generation were obtained in which 75% of plants were with red flowers and 25% plants were with white flowers.

Explain the inheritance of traits in the above cross with the help of a flow chart only along with the ratio of plants obtained. (2 M) (2022)

5. A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.

- (a) List your observations regarding
 - (i) Colour of stem in their F_1 progeny
 - (ii) Percentage of brown stemmed plants in F_2 progeny if F_1 plants are self pollinated.
 - (iii) Ratio of GG and Gg in the F_2 progeny.
- (b) Based on the findings of this cross, what conclusion can be drawn? (3 M) (2020)

6. Sex of an individual is determined by different factors in various species. Some animals rely entirely on the environmental cues, while in some other animals the

individuals can change their sex during their life, indicating that sex of some species is not genetically determined. However, in human beings, the sex of individual is largely determined genetically. (4 M) (2020)

- (a) In what way are the sex chromosomes 'X' and 'Y' different in size? Name the mismatched pair of chromosomes in humans.
- (b) Write the number of pair/pairs of sex chromosomes present in human beings. In which one of the pair (male / female) perfect pair/pairs of sex chromosomes are present?
- (c) Citing two examples, justify the statement "Sex of individual is not always determined genetically".

Or

Draw a flow chart to show that sex is determined genetically in human beings.

7. The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. Resemblances as well as differences are marked. Rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance. (2 M)

- (i) Why an offspring of human being is not a true copy of his parents in sexual reproduction? (1 M)
- (ii) While performing experiments on inheritance in pea plants, what is the difference between F_1 and F_2 generation? (1 M)
- (iii) (A) Why do we say that variations are useful for the survival of a species over time? (1 M)

Or

(iii) (B) Study Mendel's cross between two plants with a pair of contrasting characters.

$RRYY \quad \times \quad rryy$
 Round Yellow Wrinkled Green

He observed 4 types of combinations in F_2 generation. Which of these were new combinations? Why do these features which are not present in the parents, appear in F_2 generation? (2 M)

8. In order to trace the inheritance of traits Mendel crossed pea plants having one contrasting character or a pair of contrasting characters. When he crossed pea plants having round and yellow seeds with pea plants having wrinkled and green seeds, he observed that no plants with wrinkled and green seeds were obtained in the F_1 generation. When the F_1 generation pea plants were cross-bred by self-pollination, the F_2 generation had seeds with different combinations of shape and colour also. (2 M)

- (a) Write any two pairs of contrasting characters in pea plant used by Mendel other than those mentioned above. (2 M)

- (b) Differentiate between dominant and recessive traits. (1 M)
- (c) State the ratio of the combinations observed in the seeds of F_2 generation (in the above case). What do you interpret from this result? (2 M)

Or

- (c) Given below is a cross between a pure violet flowered pea plant (V) and a pure white flowered pea plant (v). Diagrammatically explain what type of progeny is obtained in F_1 generation and F_2 generation:

Pure violet flowered plant \times Pure white flowered plant.
(V V) (v v) (2 M)

Competency Based Questions

9. Consider two plant populations, A and B. In Population A, the enzyme for the hormone responsible for growth is highly efficient, while in Population B, it is less efficient. Both are in the same environment. Suggest the expected plant height distribution and mention a potential reason for the less efficiency of the enzyme in population B. (2 M)
10. Four crosses were carried out in pea plants with respect to plant height (Tall/dwarf; T/t) and seed shape (Round/Wrinkled; R/r). Study the table for crosses 'i', 'ii', 'iii', and 'iv', where parental genotypes and phenotypes are given. (5 M)
- (a) In the following crosses, write the characteristics of the progeny along with its genotype. Also, draw cross for each.

Cross:

| | | |
|-----------------|----------|------------------|
| (i) TTRR | \times | TTRR |
| (Tall-round) | | (Tall-round) |
| (ii) ttRR | \times | TTrr |
| (Short-round) | | (Tall-wrinkled) |
| (iii) TTrr | \times | ttrr |
| (Tall-wrinkled) | | (Short-wrinkled) |
| (iv) ttRR | \times | ttrr |
| (Short-round) | | (Short-wrinkled) |

- (b) Out of the progenies, which one will always produce the same variety as itself upon selfing?
11. A couple with normal hearing, have four children. Three of their children can hear normally, but one child is deaf. Deafness in their family is caused by a recessive allele. Despite no known history of deafness on either side, they seek to understand how this condition appeared in one of their children. (4 M)

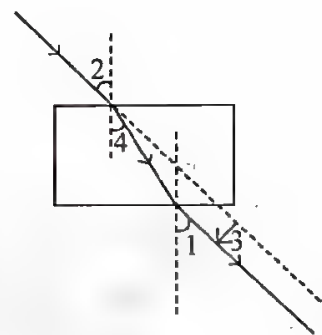
- (i) What are the likely genotypes of the parents based on the children's traits?
- (ii) What is the probability that the couple's next child will be deaf?
- (iii) (A) Determine the possible genotypes of all the children given that one child is deaf.

Or

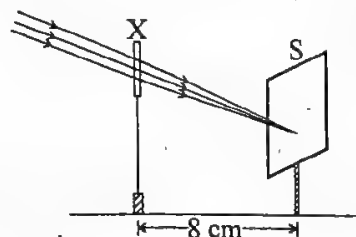
- (iii) (B) Explain why deafness appeared in only one of the four children.

9. Light-Reflection and Refraction

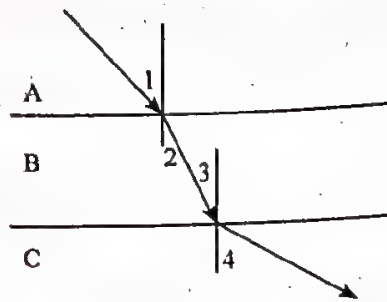
1. The correct sequencing of angle of incidence, angle of emergence, angle of refraction and lateral displacement shown in the following diagram by digits 1, 2, 3 and 4 is: (1 M) (2017)



- (a) 2, 4, 1, 3 (b) 2, 1, 4, 3
(c) 1, 2, 4, 3 (d) 2, 1, 3, 4
2. A student used a device (X) to obtain/focus the image of a well illuminated distant building on a screen (S) as shown below in the diagram. Select the correct statement about the device (X). (1 M) (2015)



- (a) The device is a concave lens of focal length 8 cm.
(b) This device is a convex mirror of focal length 8 cm.
(c) This device is a convex lens of focal length 4 cm.
(d) This device is a convex lens of focal length 8 cm
3. A ray of light is incident as shown. If A, B and C are three different transparent media, then which among the following options is true for the given diagram? (1 M) (2022)



- (a) $\angle 1 > \angle 4$ (b) $\angle 1 < \angle 2$
(c) $\angle 3 = \angle 2$ (d) $\angle 3 > \angle 4$

4. Assertion (A): The rainbow is a natural spectrum of sunlight in the sky.

Reason (R): Rainbow is formed in the sky when the sun is behind the observer, and water droplets are present in the air.

- (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

(1 M) (2024)

5. The absolute refractive indices of glass and water are $\frac{4}{3}$ and $\frac{3}{2}$ respectively. If the speed of light in glass is 2×10^8 m/s, calculate the speed of light in (i) vacuum, (ii) water.

(2 M) (2023, 2015)

6. (a) A security mirror used in a big showroom has radius of curvature 5 m. If a customer is standing at a distance of 20 m from the cash counter, find the position, nature and size of the image formed in the security mirror.

(b) Neha visited a dentist in his clinic. She observed that the dentist was holding an instrument fitted with a mirror. State the nature of this mirror and reason for its use in the instrument used by dentist. (5 M) (2020)

7. Draw a ray diagram in each of the following cases to show the formation of image, when the object is placed:

- (i) between optical centre and principal focus of a convex lens.
(ii) anywhere in front of a concave lens.
(iii) at 2F of a convex lens.

State the signs and values of magnifications in the above mentioned cases (i) and (ii). (5 M) (2020)

8. Analyse the following observation table showing variation of image distance (v) with object distance (u) in case of a convex lens and answer the questions that follow, without doing any calculations:

(5 M) (2017)

| S. No. | Object distance u (cm) | Image distance v (cm) |
|--------|-----------------------------|----------------------------|
| 1 | -90 | +18 |
| 2 | -60 | +20 |
| 3 | -30 | +30 |
| 4 | -20 | +60 |
| 5 | -18 | +90 |
| 6 | -10 | +100 |

- (a) What is the focal length of the convex lens? Give reason in support of your answer.
(b) Write the serial number of that observation which is not correct. How did you arrive at this conclusion?
(c) Take an appropriate scale to draw ray diagram for the observation at S. No. 4 and find the approximate value of magnification.

9. "A convex lens can form a magnified erect as well as magnified inverted image of an object placed in front of it." Draw ray diagram to justify this statement stating the position of the object with respect to the lens in each case. An object of height 4 cm is placed at a distance of 20 cm from a concave lens of focal length 10 cm. Use lens formula to determine the position of the image formed.

(5 M) (2015, 2022, 2016)

10. The ability of a medium to refract light is expressed in terms of its optical density. Optical density has a definite connotation. It is not the same as mass density. On comparing two media, the one with the large refractive index is optically denser medium than the other. The other medium with a lower refractive index is optically rarer. Also the speed of light through a given medium is inversely proportional to its optical density. (5 M) (2023)

- (i) Determine the speed of light in diamond if the refractive index of diamond with respect to vacuum is 2.42. Speed of light in vacuum is 3×10^8 m/s.
(ii) Refractive indices of glass, water and carbon disulphide are 1.5, 1.33 and 1.62 respectively. If a ray of light is incident in these media at the same angle (say θ), then write the increasing order of the angle of refraction in these media.

(iii) (A) The speed of light in glass is 2×10^8 m/s and in water is 2.25×10^8 m/s.

- (a) Which one of the two is optically denser and why?
(b) A ray of light is incident normally at the water-glass interface when it enters a thick glass container filled with water. What will happen to the path of the ray after entering the glass? Give reason.

Or

- (B) The absolute refractive indices of water and glass are $\frac{4}{3}$ and $\frac{3}{2}$ respectively. If the speed of light in glass is 2×10^8 m/s, find the speed of light in (i) vacuum and (ii) water.

11. Study the data given below showing the focal length of three concave mirrors A, B and C and the respective distances of objects placed in front of the mirrors:

(5 M) (2024)

| Case | Mirror | Focal Length (cm) | Object Distance (cm) |
|------|--------|-------------------|----------------------|
| 1 | A | 20 | 45 |
| 2 | B | 15 | 30 |
| 3 | C | 30 | 20 |

- (i) In which one of the above cases the mirror will form a diminished image of the object? Justify your answer.
 (ii) List two properties of the image formed in case 2.
 (iii) (A) What is the nature and size of the image formed by mirror C? Draw ray diagram to justify your answer.

Or

- (iii) (B) An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case.

Competency Based Questions

2. A student focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle screen and the lens as under

Position of candle = 12.0 cm

Position of convex lens = 50.0 cm

Position of the screen = 88.0 cm

- (a) What is the focal length of the convex lens?
 (b) Where will the image be formed if he shifts the candle towards the lens at a position of 31.0 cm?
 (c) What will be the nature of the image formed if he further shifts the candle towards the lens?
 (d) Draw a ray diagram to show the formation of the image in the case as said above.

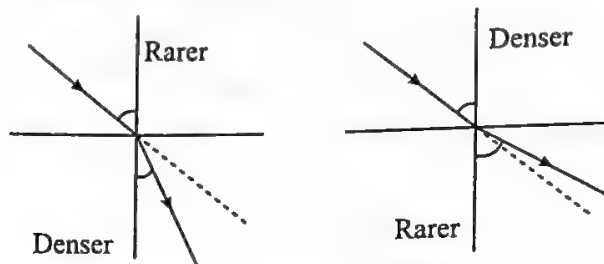
(NCERT Exemplar)

- During an optics lab session, Arjun was experimenting with a concave mirror to understand how images are formed. His teacher asked him to observe and draw ray diagrams for the images formed by the concave mirror when an object is placed at different positions relative to the mirror.

Draw ray diagrams showing the image formation by a concave mirror for the following object positions: (3 M)

- (A) Between the pole and the focus of the mirror.
 (B) Between the focus and the center of curvature of the mirror.
 (C) At the center of the curvature of the mirror.

14. When the rays of light travel from one transparent medium to another, the path of light is deviated (d). This phenomenon is called the refraction of light. The bending of light depends on the optical density of the medium through which the light passes.



The speed of light varies from medium to medium. A medium in which the speed of light is more is an optically rarer medium whereas in which the speed of light is less is an optically denser medium. Whenever light goes from one medium to another, the frequency of light does not change; however, speed and wavelength change. It is concluded that change in the speed of light is the basic cause of refraction. (4 M)

- (i) When light travels from air to glass, the ray of light bends
 (a) towards the normal (b) away from normal
 (c) anywhere (d) none of these
 (ii) A ray of light passes from medium A to another medium B. No bending of light occurs if the ray of light hits the boundary of medium B at an angle of
 (a) 0° (b) 45°
 (c) 90° (d) 120°
 (iii) When light passes from one medium to another, the frequency of light
 (a) increases (b) decreases
 (c) remains same (d) none of these
 (iv) When light passes from glass to water, the speed of light
 (a) increases
 (b) decreases
 (c) remains same
 (d) first increases then decrease

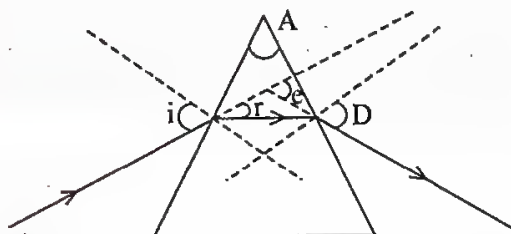
Or

- (iv) The bottom of a pool filled with water appears to be _____ due to the refraction of light
 (a) shallower (b) deeper
 (c) at same depth (d) empty

10. The Human Eye and The Colourful World

1. Study the following figure in which a student has marked the angle of incidence ($\angle i$), angle of refraction ($\angle r$), angle of emergence ($\angle e$), angle of prism ($\angle A$) and the angle of deviation ($\angle D$). The correctly marked angles are:

(1 M) (2016, 2017, 2015)

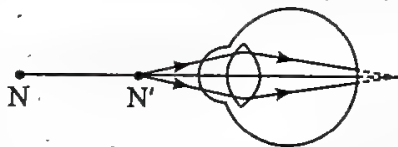


- (a) $\angle A$ and $\angle i$
 (b) $\angle A$, $\angle i$ and $\angle r$
 (c) $\angle A$, $\angle i$, $\angle e$ and $\angle D$
 (d) $\angle A$, $\angle i$, $\angle r$ and $\angle D$

2. Observe the following diagram and answer the questions following it: (2 M) (2023)



- (i) Identify the defect of vision shown.
 (ii) List its two causes.
 (iii) Name the type of lens used for the correction of this defect.
 3. What is a rainbow? Draw a labeled diagram to show the formation of a rainbow. (3 M) (2019, 2017)
 4. Study the diagram given below and answer the questions that follow: (3 M) (2024, 2023, 2018)



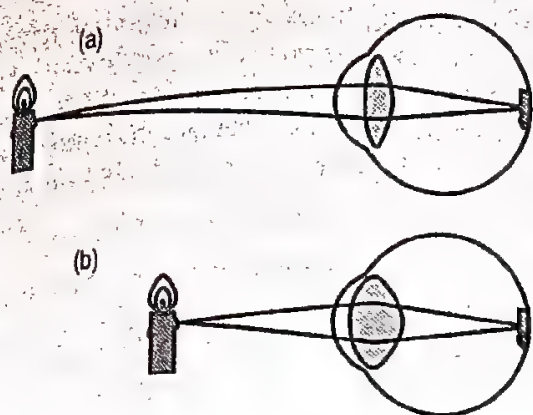
- (i) Name the defect of vision represented in the diagram. Give reason for your answer.
 (ii) List two causes of this defect
 (iii) With the help of a diagram show how this defect of vision is corrected.
 5. (a) With the help of labeled ray diagram show the path followed by a narrow beam of monochromatic light when it passes through a glass prism.
 (b) What would happen if this beam is replaced by a narrow beam of white light? (3 M) (2020)

6. (a) A student suffering from myopia is not able to see distinctly the objects placed beyond 5 m. List two possible reasons due to which this defect of vision may have arisen. With the help of ray diagrams, explain (5 M) (2017)
 (i) why the student is unable to see distinctly the objects placed beyond 5 m from his eyes.
 (ii) the type of the corrective lens used to restore proper vision and how this defect is corrected by the use of this lens.
 (b) If, in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention.

7. The far point of a myopic person is 80 cm in front of the eye. What is the nature and power of the lens required to correct the problem? (2 M)
 8. Explain why the planets do not twinkle but the stars twinkle. (2 M)
 9. Name the three common defects of vision. What are their causes? Name the type of lens used to correct each of them. (3 M)
 10. What is meant by the power of accommodation of the eye? (2 M)

Competency Based Questions

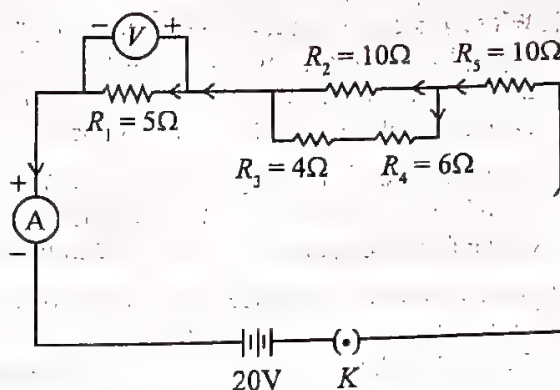
11. (a) A student is unable to see clearly the words written on the blackboard placed at a distance of approximately 3 m from him. Name the defect of vision the boy is suffering from. State the possible causes of this defect and explain the method of correcting it. (b) If, in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention. (3 M)
 12. Ravi is performing an experiment in the physics class with a glass prism and a beam of white light. They notice that when the white light passes through the prism, it splits into a range of colors, forming a spectrum.
 Explain to Ravi, the phenomenon of dispersion of light. How does this process result in the formation of a spectrum? (2 M)
 13. Answer the following questions based on the information given below:
 The far point and the near point refer to the visibility of objects close by and far away from the human eye respectively. These are the maximum and minimum distances at which an object is clearly visible to a person. (4 M)



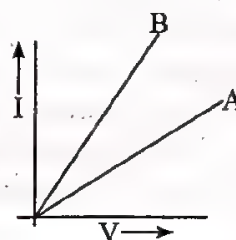
- (i) The near point and the far point are determined with regards to the function of which part of the eye?
- (a) pupil (b) retina
(c) eye-ball (d) ciliary muscles
- (ii) Which of these is a reason why a far-sighted person needs a convex lens to correct his vision?
- (a) The image forms in front of his retina.
(b) The image forms behind the retina.
(c) The image forms below the retina.
(d) The image forms on the retina.
- (iii) Under which of these can myopia and hypermetropia be classified?
- (a) breakdown of tissues
(b) incorrect bending of light in the eye
(c) incorrect reflection of light by surfaces around us
(d) incorrect coordination with brain for colour
- (iv) What do the terms "far point" and "near point" refer to in the human eye?
- (a) The maximum and minimum brightness levels visible to a person
(b) The maximum and minimum distances at which an object is clearly visible to a person.
(c) The points where the human eye focuses light most effectively.
(d) The ability of the eye to distinguish colors.

11. Electricity

- Write the mathematical expression for Joule's law of heating. (1 M) (2020, 2018)
- List the factors on which the resistance of a uniform cylindrical conductor of a given material depends. (2 M) (2022, 2018, 2015, 2023)
- Study the following circuit and find:



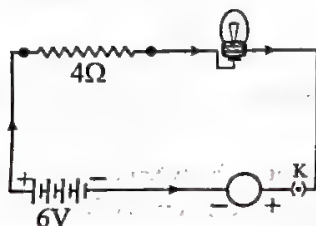
- (i) Effective resistance of the circuit
(ii) Current drawn from the battery
(iii) Potential difference across the 5Ω resistor (3 M) (2022)
4. (i) Write the relation between resistance R and electrical resistivity ρ of the material of a conductor in the shape of cylinder of length l and area of cross-section A . Hence derive the SI unit of electrical resistivity. (5 M) (2024)
- (ii) The resistance of a metal wire of length 3 m is 60Ω . If the area of cross-section of the wire is $4 \times 10^{-7} \text{ m}^2$, calculate the electrical resistivity of the wire.
- (iii) State how would electrical resistivity be affected if the wire (of part 'ii') is stretched so that its length is doubled. Justify your answer.
5. (i) Define electric power. Express it in terms of potential difference (V) and resistance (R). (5 M) (2024)
- (ii) An electric oven is designed to work on the mains voltage of 220 V. This oven consumes 11 units of electrical energy in 5 hours. Calculate:
- (a) power rating of the oven
(b) current drawn by the oven
(c) resistance of the oven when it is red hot
6. (i) How is electric current related to the potential difference across the terminals of a conductor? Draw a labeled circuit diagram to verify this relationship.
- (ii) Why should an ammeter have low resistance?
- (iii) Two $V - I$ graphs A and B for series and parallel combinations of two resistors are as shown. Giving reason state which graph shows (a) series, (b) parallel combination of the resistors. (5 M) (2023)



7. (a) With the help of a suitable circuit diagram prove that the reciprocal of the equivalent resistance of a group of resistances joined in parallel is equal to the sum of the reciprocals of the individual resistances.

(b) In an electric circuit two resistors of $12\ \Omega$ each are joined in parallel to a 6 V battery. Find the current drawn from the battery. (5 M) (2019, 2015)

8. An electric lamp of resistance $20\ \Omega$ and a conductor of resistance $4\ \Omega$ are connected to a 6 V battery as shown in the circuit. Calculate: (5 M) (2019, 2015)



- The total resistance of the circuit,
- The current through the circuit,
- The potential difference across the (i) electric lamp and (ii) conductor,
- Power of the lamp.

9. Calculate the resistance of a metal wire of length 2 m and area of cross-section $1.55 \times 10^{-6}\text{ m}^2$, if the resistivity of the metal is $2.8 \times 10^{-8}\ \Omega\text{ m}$. (2 M)

10. Show how you would join three resistors, each of resistance $9\ \Omega$, so that the equivalent resistance of the combination is: (2 M)

- $13.5\ \Omega$,
- $6\ \Omega$.

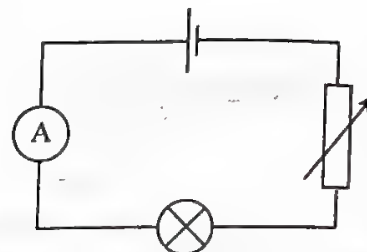
11. An electric iron consumes energy at a rate of 840 W when heating is at the maximum and 360 W when heating is at the minimum. The voltage at which it is running is 220 V . What are the current and resistance in each case? (2 M)

12. A nichrome wire has a resistance of $10\ \Omega$. Find the resistance of another nichrome wire, whose length is three times and area of cross-section four times the first wire. (2 M)

Competency Based Questions

13. While studying the dependence of potential difference (V) across a resistor on the current (I) passing through it, in order to determine the resistance of the resistor, a student took 5 readings for different values of current and plotted a graph between V and I . He got a straight line graph passing through the origin. What does the straight line signify? Write the method of determining resistance of the resistor using this graph? (CBSE 2019)

14. If you are conducting an experiment in your physics lab to verify Ohm's Law. As you set up your circuit with a resistor, voltmeter, and ammeter, you need to ensure accurate and reliable results. What are the crucial points you should keep in mind to verify Ohm's Law in this scenario? (1 M)



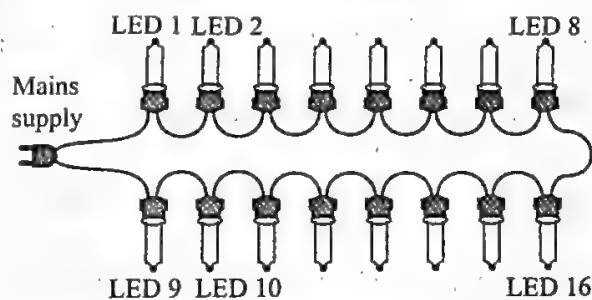
- Ammeter and voltmeter should be connected in series
- Ammeter should be connected in series and voltmeter in parallel
- Ammeter should be connected in parallel and voltmeter in series
- Ammeter and voltmeter should be connected in parallel

15. Read the information given below and answer following questions.

Suresh bought a packet of 100 LEDs to make his own light for decoration in his house. The packet on the LEDs has the following printed on a label:

LED, 0.2 W , 3 V

To understand how he should connect the LEDs, he referred to the following circuit diagram. (4 M)



(i) Which of the following describes how the LEDs are connected in the circuit diagram?

- all in series
- all in parallel
- 8 each in a series combination, and the two combinations in parallel
- 8 each in a parallel combination, and the two combinations in series

(ii) If the LED marked 'LED 2' in the diagram stops working, which other LEDs will also stop working?

(Note: When an LED stops working, current cannot flow across it.)

(a) only LED 3 to LED 8

(b) only LED 3 to LED 8 and LED 1

(c) all the other LEDs in the circuit

(d) none of the other LEDs in the circuit

(iii) Suresh decided to connect all the LEDs in his lights in a series combination.

How many LEDs will he need to connect if he is going to connect the lights to a 240 V mains supply so that the LEDs work at their power rating?

(a) 16

(b) 80

(c) 240

(d) 1200

(iv) What will happen if he connects 100 LEDs, all in a parallel combination, to the 240 V mains supply?

(a) Each LED will work as expected since the available voltage is more than 3 V.

(b) Each LED will have a potential difference of 240 V and therefore they will get damaged.

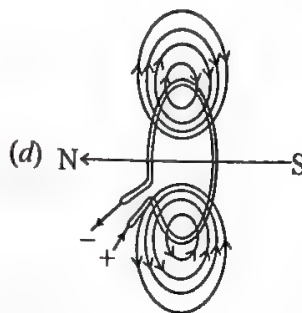
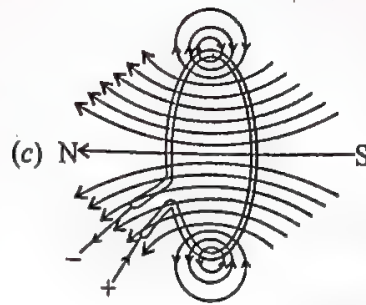
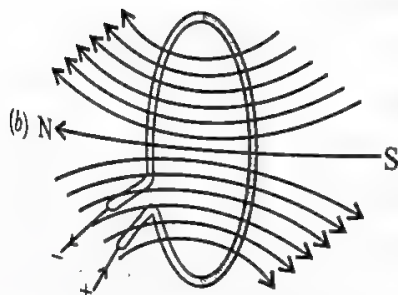
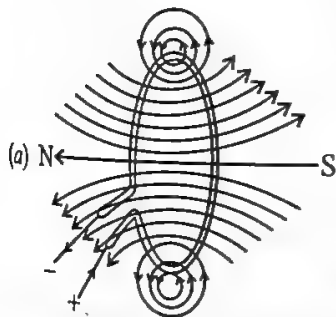
(c) Each LED will glow but the ones closer in the circuit to the main supply will glow brighter.

(d) Each LED will have a potential difference of 2.4 V across it and therefore will glow dimmer than normal.

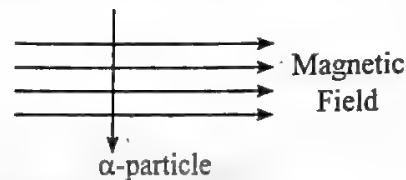
12. Magnetic Effects of Electric Current

1. The correct pattern of magnetic field lines of the field produced by a current carrying circular loop is:

(1 M) (2023)



2. An alpha particle enters a uniform magnetic field as shown. The direction of force experienced by the alpha particle is: (1 M) (2023)



(a) towards right

(b) towards left

(c) into the page

(d) out of the page

3. Assertion (A): A current carrying straight conductor experiences a force when placed perpendicular to the direction of magnetic field.

Reason (R): The net charge on a current carrying conductor is always zero. (1 M) (2023)

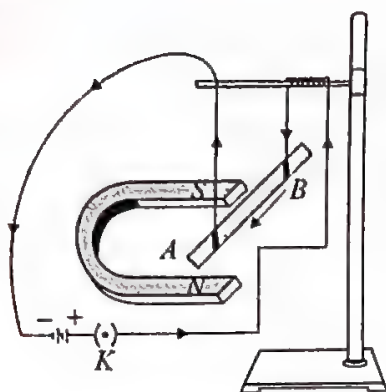
(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

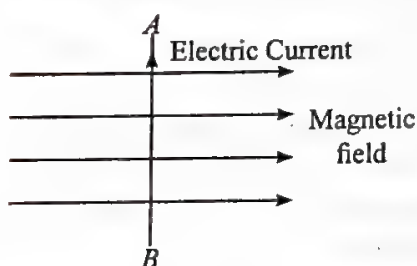
(d) Assertion (A) is false but Reason (R) is true.

4. As shown in the diagram an aluminum rod 'AB' is suspended horizontally between the two poles of a strong horse shoe magnet in such a way that the axis of rod is horizontal and the direction of the magnetic field is vertically upward. The rod is connected in series with a battery and a key. (2 M) (2022)



State giving reason:

- (a) What is observed when a current is passed through the aluminum rod from end B to end A?
 - (b) What change is observed in a situation in which the axis of the rod 'AB' is moved and aligned parallel to the magnetic field and current is passed in the rod in the same direction?
5. "Magnetic field is a physical quantity that has both direction and magnitude." How can this statement be proved with the help of magnetic field lines of a bar magnet? (2 M) (2022)
6. (i) Draw the pattern of magnetic field lines of
 (1) a current carrying solenoid
 (2) a bar magnet
 (ii) List two distinguishing features between the two fields. (3 M) (2023, 2022, 2019, 2015)
7. (a) State Fleming's left hand rule. Apply this rule to determine the direction of force experienced by a straight current carrying conductor AB placed in a uniform magnetic field as shown.



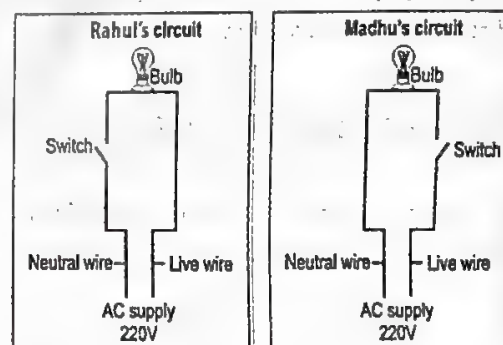
- (b) What will happen to an electron which enters in the same field in the same direction in which the current is flowing in the conductor AB? Give reason to justify your answer. (3 M) (2024)
8. Draw a rough sketch of the pattern of field lines due to:
- (i) Current flowing into a circular coil
 - (ii) Solenoid carrying current. (2 M)
9. What are the magnetic field lines? Justify the following statements to show that: (2 M)

- (a) Two magnetic field lines never intersect each other.
- (b) Magnetic fields are closed curves.

10. What safety measures must be implemented to prevent household electrical circuit overloading? (2 M)

Competency Based Questions

11. (a) Draw a schematic labelled diagram of a domestic wiring circuit which includes (i) a main fuse (ii) power meter (iii) one light point and (iv) a power plug.
 (b) Why is it necessary to connect an earth wire to electrical appliances having metallic covers? (5 M)
12. Riya is helping her sister build a science project about magnets. She has a collection of bar magnets to use. While playing with her, she notices something interesting about how the magnets behave when you bring their ends close to each other.
 When she brings the ends of two magnets close to each other, how do the like poles (both north or both south) interact compared to the unlike poles (one north and one south)? (3 M)
13. Observe Madhu's and Rahul's circuits shown below. (4 M)



- (i) What is the primary safety concern with Rahul's circuit?
 (a) The bulb might not turn on.
 (b) The switch is connected to the live wire, which is a safer design.
 (c) The switch is connected to the neutral wire, which can be unsafe.
 (d) There is no safety concern with Rahul's circuit.
- (ii) Which circuit ensures that the entire circuit is de-energized when the switch is off?
 (a) Madhu's circuit. (b) Rahul's circuit
 (c) Both circuits. (d) Neither circuit
- (iii) If the switch in Rahul's circuit is turned off, what will be the state of the bulb and the circuit?

- (a) The bulb will be off, but the circuit will still be live up to the switch.
 - (b) The bulb will be on, and the circuit will be live.
 - (c) The bulb will be off, and the circuit will be completely de-energized.
 - (d) The bulb will be on, but the circuit will be de-energized up to the switch.
- (iv) Which of the following best describes the difference in wiring between Madhu's and Rahul's circuits?
- (a) Madhu's circuit has the switch on the neutral wire, while Rahul's circuit has it on the live wire.
 - (b) Madhu's circuit has the switch on the live wire, while Rahul's circuit has it on the neutral wire.
 - (c) Both circuits have the switch on the neutral wire.
 - (d) Both circuits have the switch on the live wire.

13. Our Environment

1. The cartoon below addresses a growing concern:



What impact will the process shown in the image have on Humans if they occupy the last trophic level? Explain.

(2 M) (CBSE SQP, 2024)

2. In the following food chain, only 2J of energy was available to the peacocks. How much energy would have been present in Grass? Justify your answer. (2 M) (2022)

Grass → Grasshopper → Frog → Snake → Peacock

3. List two reasons to show that the existence of decomposers is essential in an ecosystem. (2 M) (2023)

4. Write one difference between biodegradable and non-biodegradable wastes. List two impacts of each type of the accumulated waste on environment if not disposed of properly. (3 M) (2024, 2023, 2022)

5. Use of pesticides to protect our crops affect organisms at various trophic levels especially human beings. Name the phenomenon involved and explain how does it happen. (3 M) (2024, 2023)

6. A gas 'X' which is a deadly poison is found at the higher level of atmosphere and performs an essential function. Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas? What measures have

been taken by an international organization to check the depletion of the layer containing this gas? (3 M) (2024)

7. (i) Construct a food chain of four trophic levels comprising the following:

Hawk, snake, plants, rat.

- (ii) 20,000J of energy was transferred by the producers to the organism of second trophic level. Calculate the amount of energy that will be transferred by organisms of the third trophic level to the organisms of the fourth trophic level. (3 M) (2023, 2022, 2017)

8. (a) From the following group of organisms create a food chain which is the most advantageous for Human beings in terms of energy.

Hawk, Rat, Cereal Plant,
Goat, Snake,
Human Being

- (b) State the possible disadvantage if the cereal plant is growing in soil rich in pesticides.

- (c) Construct a food web using the organisms mentioned above. (3 M) (2020)

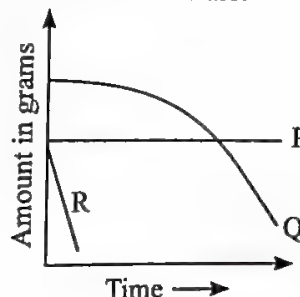
9. In a laboratory experiment, students are investigating the impact of light on the growth of aquatic plants. They set up two aquariums: Aquarium A is placed in natural sunlight, while Aquarium B is kept in a dimly lit room with minimal light exposure. Both aquariums contain the same species and number of plants, with identical water conditions and nutrients. (5 M)

- (a) What differences in plant growth would you expect to observe between Aquarium A and Aquarium B after four weeks?

- (b) What are the consequences for the aquarium ecosystem if decomposers are absent?

Competency Based Questions

10. Samaira conducted an experiment where she buried three different types of solid wastes (P, Q, and R) under the soil in a pot to study their decomposition rates. The graph below shows the decomposition rates of these wastes over time. (1 M)



Select the option that correctly identifies P, Q, and R:

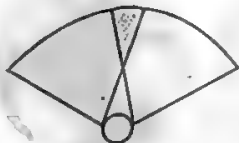
| P | Q | R |
|-------------------|-----------------|--------------|
| (a) Banana peel | Plastic bottle | Paper cup |
| (b) Polythene bag | Bone | Orange peel |
| (c) Apple core | Metal can | Cardboard |
| (d) Rubber tire | Vegetable scrap | Wooden stick |

11. Shown here is the extent to which two different animals can see in either direction without turning their heads.

In animal 1, the eyes are placed towards the front of the head and in animal 2, the eyes are placed on either side of the head. (3 M)



Animal 1



Animal 2

Since the placement of eyes in the two animals is different, their vision is also slightly different.

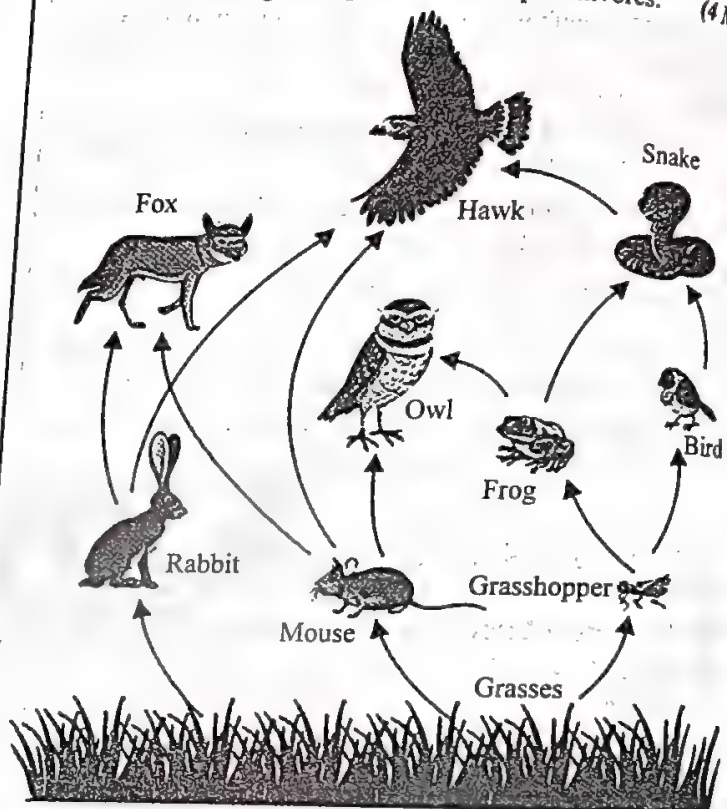
In the figures above, the grey part represents the parts that can be seen by both eyes at a time, whereas the white parts represent those parts that can be seen only by one eye at a time.

Animal 2 can see a broader area at any time compared to animal 1. Animal 1 can distinguish depths better compared to animal 2.

- Based on this, which of the two animals is most likely to be a predator and why?
- Give an example of an organism that can be categorized as Animal 2.

12. A food chain is a very important part of any ecosystem where one organism relies on another organism for its

food source. In any food chain, there are different trophic levels starting from producers to top carnivores. (4)



- What is the maximum number of trophic levels possible in any food chain in a given food web?
- In the given food web, how many organisms are secondary consumers?
- (A) Which organism is being eaten by the maximum number of organisms?

Or

- (B) If DDT is sprayed on grass then which organism would have the maximum concentration of DDT?

MATHEMATICS

CHAPTER-1

REAL NUMBERS

Cheat Sheet

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The Fundamental Theorem of Arithmetic:

- Every composite number can be expressed (factorized) as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.

Note: Fundamental theorem of arithmetic is called a Unique Factorisation Theorem.

Composite number = Product of prime numbers.

e.g. $\therefore 24 = 2 \times 2 \times 2 \times 3$

$= 2^3 \times 3$, where 2 and 3 are prime numbers

Theorems:

- Theorem 1:** Let p be a prime number. If p divides a^2 , then p divides a , where a is a positive integer.

- Theorem 2:** $\sqrt{2}$ is an irrational number.

Note: Square root of any prime number is always an irrational number

CBSE 2024, 2023, 2020, 2019

Irrational Numbers:

It cannot be expressed as $x = \frac{p}{q}$, $q \neq 0$, where p and q are integers.

e.g.: $\sqrt{2}, \sqrt{3}, \pi, \dots$

CBSE 2024, 2023, 2022 Term-I, 2020, 2019

Prime Factorisation Method:

Prime Factorisation is a way of representing a number as a product of its prime factors. It is also used to find out the H.C.F and L.C.M.

For any two positive integers a and b we have,

$H.C.F(a, b) \times L.C.M(a, b) = a \times b$

e.g.: Find H.C.F of 24 and 36.

Prime factors of 24 : $2^3 \times 3^1$

Prime factors of 36 : $2^2 \times 3^2$

H.C.F = $2^2 \times 3^1 = 12$

e.g.: Find L.C.M of 12 and 18.

Prime factors of 12 : $2^2 \times 3^1$

Prime factors of 18 : $2^1 \times 3^2$

L.C.M = $2^2 \times 3^2 = 36$

CBSE 2020

Prime Number:

Prime numbers are natural numbers that are divisible by only 1 and the number itself.
e.g. 2, 3, 5, 7, 11, 13....

CBSE 2024

Composite Number:

Composite numbers are numbers that have more than two factors.
e.g. 4, 6, 8, 9, 10, 12....

CBSE 2022 Term-I

Co-prime Number:

Co-prime numbers are two pairs of numbers which have a common factor of 1.
e.g. (14, 15), (1, 99), (8, 15)

Rational Numbers:

It can be expressed as $x = \frac{p}{q}$, $q \neq 0$, where p and q are integers.

e.g.: $\frac{1}{4}, \frac{2}{3}, 2, \dots$

Integers 'Z' or 'I':

Integers include all whole numbers and negative numbers.

e.g.: $\dots -3, -2, -1, 0, 2, 3, \dots$

Real Numbers

Negative Integer:

e.g.: $-1, -2, -3, \dots$

Whole Number 'W':

The whole number which includes all the non-negative integers.

$W: 0, 1, 2, 3, \dots$

Zero

Natural Number 'N':

Natural numbers are all positive integers

$N: 1, 2, 3, \dots$

CHAPTER-2 POLYNOMIALS

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Cheat Sheet

Linear Polynomial:

$$p(x) = ax + b, a \neq 0$$

Quadratic Polynomial:

$$p(x) = ax^2 + bx + c, a \neq 0$$

Cubic Polynomial:

$$p(x) = ax^3 + bx^2 + cx + d, a \neq 0$$

Types of Polynomial

Polynomial:
A polynomial is defined as an expression that includes variables, constants and exponents.

Degree of Polynomial:

Highest power of the variable is known as the degree of the polynomial.

Formation of Quadratic and Cubic Polynomial:

1. Quadratic polynomial having α and β as its zeroes is given by $p(x) = k\{x^2 - (\alpha + \beta)x + \alpha\beta\}$, where k is any non-zero real number.
2. Cubic polynomial having α , β , and γ as its zeroes is given by $p(x) = k\{x^3 - (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma\}$, where k is any non-zero real number.

General Form:

$$p(x) = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + a_3x^{n-3} + \dots + a_{n-1}x^1 + a_n$$

where all the powers are non-negative integers and $a_0, a_1, \dots, a_n \in R$

Zeroes of Polynomials:

The value of x where the graph intersect x -axis

Zeroes of Linear Polynomial:

If k is zero of $p(x) = ax + b, a \neq 0$

i.e. $p(k) = ak + b = 0$

$$\therefore k = \frac{-b}{a} = \frac{-\text{Constant term}}{\text{Coefficient of } x}$$

Zeroes of Quadratic Polynomial:

If α and β are zeroes of quadratic polynomial $p(x) = ax^2 + bx + c, a \neq 0$

$$\alpha + \beta = \frac{-b}{a} = \frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$\text{and } \alpha \cdot \beta = \frac{c}{a} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$$

Zeroes of Cubic Polynomial:

If α, β , and γ are the zeroes of the cubic polynomial $p(x) = ax^3 + bx^2 + cx + d$, then,

$$\alpha + \beta + \gamma = \frac{-b}{a} = \frac{-\text{Coefficient of } x^2}{\text{Coefficient of } x^3}$$

$$\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a} = \frac{\text{Coefficient of } x}{\text{Coefficient of } x^3}$$

$$\alpha \beta \gamma = \frac{-d}{a} = \frac{-\text{Constant term}}{\text{Coefficient of } x^3}$$

CHAPTER-3

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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Cheat Sheet

Substitution Method:

To find the solution using this method we substitute value of one variable (in terms of another variable) from one equation to another equation.

Example: $7x - 15y = 2$... (i)
 $x + 2y = 3$... (ii)

Sol. From equation (ii), $x = 3 - 2y$... (iii)
Substitute value of x in eq. (i)

$$7(3 - 2y) - 15y = 2$$

$$-29y = -19 \Rightarrow y = \frac{19}{29}$$

$$\therefore \text{In eq. (iii)} x = 3 - 2\left(\frac{19}{29}\right) = \left(\frac{49}{29}\right)$$

Definition: A collection of two linear equations in the same two variables.

Solution:

The value of the two variables which satisfy both the linear equations in the two variables

Algebraic Method

Pair of Linear Equations in Two Variables

Graphical Representation and Nature of equations/solutions

Elimination Method:

To find the solution using this method we eliminate one of the variables by adding/subtracting both equation after, if necessary, multiplying the equation by appropriate numbers.

Example: $2x + 3y = 8$... (i)
 $4x + 6y = 7$... (ii)

Sol. From equation (i) $\times 2$ - eq. (ii) $\times 1$, we have
 $(4x - 4x) + (6y - 6y) = 16 - 7$
 $0 = 9$, which is a false statement
The pair of equation has no solution

General Form:

$$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$$

Where, a_1, a_2, a_3, b_1, b_2 & b_3 are real numbers such that

a_1 & b_1 and a_2 & b_2 can not be equal to zero simultaneously.

| S. No. | Pair of Lines | $\frac{a_1}{a_2}$ | $\frac{b_1}{b_2}$ | $\frac{c_1}{c_2}$ | Compare the Ratios | Graphical Representation | Algebraic Interpretation |
|--------|---|-------------------|-------------------|-------------------|--|--------------------------|--|
| 1. | $x - 2y = 0$ $3x + 4y - 20 = 0$ | $\frac{1}{3}$ | $\frac{-2}{4}$ | $\frac{0}{-20}$ | $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ | | CBSE 2024, 2020 Exactly one solution-consistent (Unique) |
| 2. | $2x + 3y - 9 = 0$ $4x + 6y - 18 = 0$ | $\frac{2}{4}$ | $\frac{3}{6}$ | $\frac{-9}{-18}$ | $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ | | CBSE 2023, 2019 Infinitely many solutions-consistent (Dependent) |
| 3. | $x + 2y - 4 = 0$ $2x + 4y - 12 = 0$ | $\frac{1}{2}$ | $\frac{2}{4}$ | $\frac{-4}{-12}$ | $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ | | CBSE 2024, 2022, Term-I No solutions-Inconsistent |

CHAPTER-4

QUADRATIC EQUATIONS

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Cheat Sheet

Factorisation Method:

CBSE 2024, 2023, 2022, Term-I & II, 2020, 2019

In this method ($ax^2 + bx + c = 0$) can be expressible as the product of two linear expressions, say $(px + q)$ and $(rx + s)$, where p, q, r are real numbers such that $p \neq 0, r \neq 0$.

Then $ax^2 + bx + c = 0 \Rightarrow (px + q)(rx + s) = 0$

$(px + q) = 0$ or $(rx + s) = 0 \Rightarrow x = \frac{-q}{p}$ or $x = \frac{-s}{r}$

Quadratic Formula:

CBSE 2024, 2020

For $ax^2 + bx + c = 0, D = b^2 - 4ac,$

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

Method of Finding Solution

An equation of the form $ax^2 + bx + c = 0$ where a, b, c are real numbers and $a \neq 0$, is called a quadratic equation in x .

CBSE 2022, Term-II

Solution of Roots of Quadratic Equation:

A real number α is called a root of the quadratic equation $ax^2 + bx + c = 0, a \neq 0$ if $a\alpha^2 + b\alpha + c = 0$.

Quadratic Equation

Application:

CBSE 2020

- ☐ Speed = $\frac{\text{Distance}}{\text{Time}}$
- ☐ Area of figures
- ☐ Volume of water = flow rate \times time
- ☐ Number of ages

Nature of roots:

CBSE 2019

$ax^2 + bx + c = 0, a \neq 0$, where $D = (b^2 - 4ac)$ and the roots are given by $\alpha = \frac{-b + \sqrt{D}}{2a}$ and $\beta = \frac{-b - \sqrt{D}}{2a}$

Case III:

CBSE 2019

When $D < 0$, roots are imaginary.

Case I:

CBSE 2023

When $D > 0$, roots are real, distinct and given by

$$\alpha = \frac{-b + \sqrt{D}}{2a} \text{ and } \beta = \frac{-b - \sqrt{D}}{2a}$$

Case II:

CBSE 2024, 2023, 2022, Term-II, 2019

When $D = 0$, roots are real and equal and roots are

$$\text{given by } \alpha = \frac{-b}{2a} \text{ and } \beta = \frac{-b}{2a}$$

CHAPTER-5

ARITHMETIC PROGRESSIONS

Cheat Sheet

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CBSE 2024, 2023, 2022 Term-I, 2020, 2019

Sum of n^{th} term:

- When first term (a) and common difference (d) is given, then,

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

- When first term (a) and last term (l) is given, then

$$S_n = \frac{n}{2}[a + l]$$

CBSE 2024, 2020

General form of an A.P.

$$a, a + d, a + 2d, \dots, a + (n-1)d$$

CBSE 2023, 2020

Common difference (d)

- The fixed number added in an arithmetic progression is the common difference i.e., difference between the two consecutive terms of an A.P. is called common difference.

$$d = a_n - a_{n-1}$$

- It can be positive, negative or zero.

Types of an A.P.:

Finite A.P.: An arithmetic progression (A.P) in which number of terms are finite is known as finite A.P.

$$a_1, a_2, \dots, a_n$$

Infinite A.P.: An arithmetic progression (A.P) in which number of terms are infinite is known as infinite A.P.

$$a_1, a_2, a_3, \dots$$

Arithmetic Progressions

n^{th} term from end

$$a_n = l - (n-1)d$$

Here, l is last term and d is common difference

Definition:

A sequence of numbers in which each term is obtained by adding/subtracting a fixed number to the preceding term, except the first term is called an Arithmetic Progression.

CBSE 2024, 2023, 2022 Term-II, 2020, 2019

n^{th} term of an A.P.

$$a_n = a + (n-1)d$$

Here, a is first term and d is common difference

Term:

Each number in the sequence of an A.P.

CHAPTER-6

TRIANGLES

Cheat Sheet

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Similarity of Triangles

CBSE 2023, 2020, 2019

- ☐ Corresponding angles are congruent
- ☐ Corresponding sides are in same ratio

Congruent of Triangles

CBSE 2024, 2023, 2022 Term-I, 2020

- ☐ Corresponding angles are congruent
- ☐ Corresponding sides are also congruent

Triangles

CBSE 2024, 2023, 2022 Term-I, 2019

Criteria for Similarity of Triangles

AA (Angle-Angle) Criteria: If two angles of one triangle are respectively equal to two angles of another triangle, then the two triangles are similar.

AAA (Angle-Angle-Angle): If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio and hence the two triangles are similar.

SSS (Side-Side-Side): If in two triangles, sides of one triangle are proportional to (i.e., in the same ratio of) the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similar.

SAS (Side-Angle-Side): If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.

Theorem

- ☐ If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
- ☐ If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.
- ☐ If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportional) and hence the two triangles are similar.
- ☐ If in two triangles, sides of one triangle are proportional to (i.e., in the same ratio of) the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similar.
- ☐ If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.

Important Terms

- ☐ **Scale Factor:** The scale factor is the ratio of any two corresponding lengths in similar figures. It determines the relationship between the corresponding sides of the figures.
- ☐ **Corresponding Angles:** Corresponding angles are angles that occupy the same relative positions in two or more similar figures
- ☐ **Corresponding Sides:** Corresponding sides are sides that are in the same relative position in two or more similar figures.
- ☐ **Proportional:** Two quantities are proportional if they have a constant ratio. In the context of similar figures, corresponding sides are proportional, meaning their lengths are in the same ratio.
- ☐ **Congruent:** Two figures are said to be congruent if all the corresponding sides and all the corresponding angles are equal in measure.
- ☐ **Similar:** Two figures having the same shape but not necessarily the same size is known as similar.

CHAPTER-7

COORDINATE GEOMETRY

Cheat Sheet

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$A(x_1, y_1)$

$(x_2, y_2) B$ $C(x_3, y_3)$

$$G = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

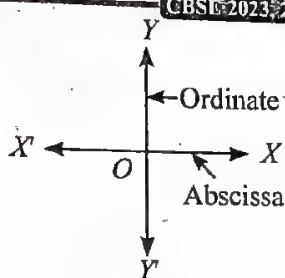
Example: Determine the centroid of a triangle whose vertices are (5, 3), (6, 1) and (7, 8)

Sol. Given parameters are,
 $(x_1, y_1) = (5, 3)$, $(x_2, y_2) = (6, 1)$
and $(x_3, y_3) = (7, 8)$

$$G = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

$$G = \left(\frac{5+6+7}{3}, \frac{3+1+8}{3} \right)$$

$$G = \left(\frac{18}{3}, \frac{12}{3} \right) = (6, 4)$$



Horizontal = x-axis (Abscissa)
Vertical = y-axis (Ordinate)

Coordinate Axis

Coordinate Geometry

Centroid

Mid-point Line Segment

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The mid-point of the line segment joining the points

$$P(x_1, y_1) \text{ and } Q(x_2, y_2) \text{ is } \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Example: Find the coordinates of mid-point of the line segment joining (4, -1) and (-2, -3).

Sol. Let the given points be $P(4, -1)$ and $Q(-2, -3)$
Since, the mid-point of the line segment joining the points $P(4, -1)$ and $Q(-2, -3)$

$$= \left(\frac{4-2}{2}, \frac{-1-3}{2} \right) = \left(\frac{2}{2}, \frac{-4}{2} \right) = (1, -2)$$

Section Formula

Distance Formula

CBSE 2024, 2023, 2022, Term-I, 2020, 2019

The coordinates of the point $P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ internally in the ratio $m_1 : m_2$

$$\text{are } \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$$

Example: Find the coordinates of the point which divides the line joining of (-1, 7) and (4, -3) in the ratio 2 : 3.

Sol. Let $P(x, y)$ be the required point. Thus, we have

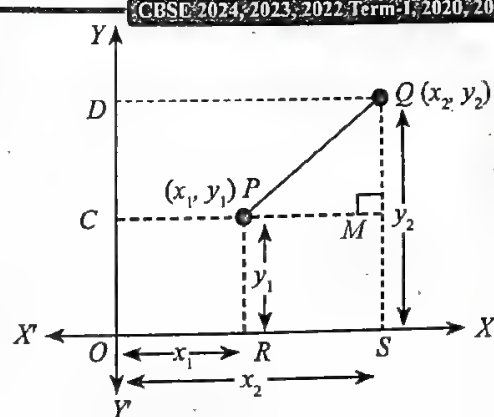
$$x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2} \text{ and } y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}$$

Therefore,

$$x = \frac{2 \times 4 + 3 \times (-1)}{2 + 3} = \frac{8 - 3}{5} = \frac{5}{5} = 1$$

$$y = \frac{2 \times (-3) + 3 \times 7}{2 + 3} = \frac{-6 + 21}{5} = \frac{15}{5} = 3$$

So, the coordinates of P are (1, 3).



$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Example: Find the distance between the point $P(-5, 7)$ and $Q(-1, 3)$.

Sol. We have,

$$\text{Distance formula: } d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\text{Given, } x_1 = -5, x_2 = -1, y_1 = 7, y_2 = 3$$

$$\text{So, } d = \sqrt{(-1 - (-5))^2 + (3 - 7)^2} = \sqrt{(4)^2 + (-4)^2} \\ = \sqrt{16 + 16} = \sqrt{32} = 4\sqrt{2} \text{ units}$$

CHAPTER-8

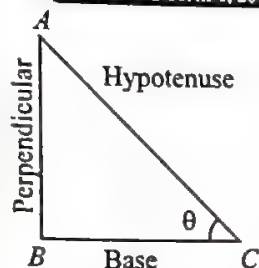
INTRODUCTION TO TRIGONOMETRY

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CBSE 2022 Term-I, 2019



$$\sin \theta = \frac{AB}{AC}$$

$$\cos \theta = \frac{BC}{AC}$$

$$\tan \theta = \frac{AB}{BC}$$

$$\operatorname{cosec} \theta = \frac{AC}{AB}$$

$$\sec \theta = \frac{AC}{BC}$$

$$\cot \theta = \frac{BC}{AB}$$

CBSE 2022 Term-I

$$\sin \theta = \frac{1}{\operatorname{cosec} \theta} \Rightarrow \operatorname{cosec} \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sec \theta} \Rightarrow \sec \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{1}{\cot \theta} \Rightarrow \cot \theta = \frac{1}{\tan \theta}$$

Trigonometric Ratios and Angles

Right Angled Triangle

Trigonometric Identities

Introduction to Trigonometry

CBSE 2024, 2023, 2022
Term-I, 2020, 2019

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\sec^2 \theta - \tan^2 \theta = 1$$

$$\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

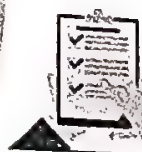
Trigonometric Ratios of some Specific Angles.

CBSE 2024, 2023, 2022 Term-I, 2019

| θ | 0° | 30° | 45° | 60° | 90° |
|------------------------|-------------|----------------------|----------------------|----------------------|-------------|
| \sin | 0 | $\frac{1}{2}$ | $\frac{1}{\sqrt{2}}$ | $\frac{\sqrt{3}}{2}$ | 1 |
| \cos | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{1}{\sqrt{2}}$ | $\frac{1}{2}$ | 0 |
| \tan | 0 | $\frac{1}{\sqrt{3}}$ | 1 | $\sqrt{3}$ | Not Defined |
| cosec | Not Defined | 2 | $\sqrt{2}$ | $\frac{2}{\sqrt{3}}$ | 1 |
| \sec | 1 | $\frac{2}{\sqrt{3}}$ | $\sqrt{2}$ | 2 | Not Defined |
| \cot | Not Defined | $\sqrt{3}$ | 1 | $\frac{1}{\sqrt{3}}$ | 0 |

CHAPTER-9

SOME APPLICATIONS OF TRIGONOMETRY

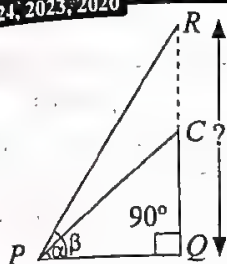


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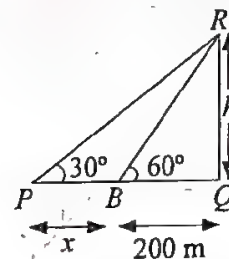
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Find length QR

CBSE 2023, 2019

Distance between Two Points

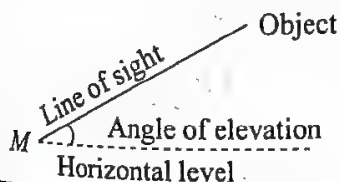


Find x and h

Trigonometric ratios can be used to find the distances and heights of those objects for which direct measurement of lengths are not possible.

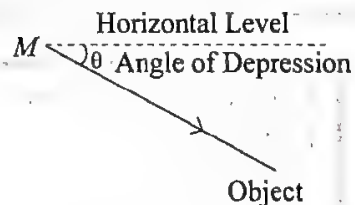
Angle of Elevation:

The angle of elevation of the point viewed is the angle formed by the line of sight with the horizontal when the point being viewed is above the horizontal level.



Angle of Depression:

The angle of depression of a point on the object being viewed is the angle formed by the line of sight with the horizontal when the point is below the horizontal level.



**Some Application
of Trigonometry**

Line of Sight:

Line of sight is the line drawn from the eye of an observer to the point in the object viewed by the observer.

CHAPTER-10

CIRCLES

Cheat Sheet

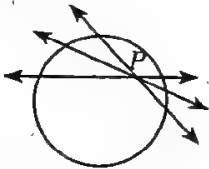
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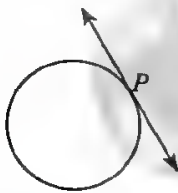
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Number of Tangents

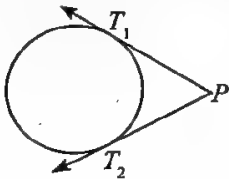
- There are no tangents to a circle passing through a point lying inside the circle.



- There is one and only one tangent to a circle passing through a point lying on the circle.



- There are exactly two tangents to a circle through a point lying outside the circle.

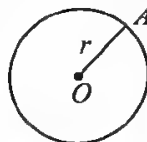


Terms Related to Circle:

- Chord
- Arc
- Sector
- Segment
 - Minor segment
 - Major segment

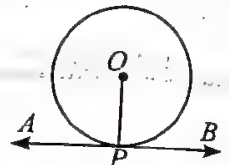
Definition

The locus of a point that is equidistant from a fixed point is known as a circle. The fixed point is called centre and the distance between the fixed point and the point on the circle is called radius.



Theorem 1

The tangent at any point of a circle is perpendicular to the radius through the point of contact.

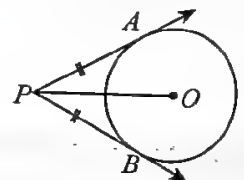


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Theorem 2

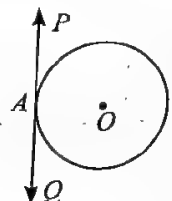
The lengths of tangents drawn from an external point to a circle are equal.



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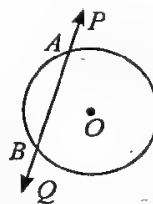
Tangent

A line intersecting a circle at only one point is known as tangent and the intersecting point is known as point of contact.



Secant

A line intersecting a circle at two different points is known as secant.



Circles

CHAPTER-11

AREAS RELATED TO CIRCLES



Cheat Sheet

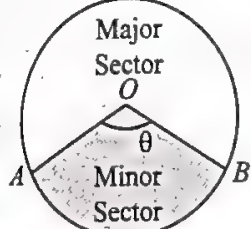
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Areas Related to Circles

Sector of circle

CBSE 2020



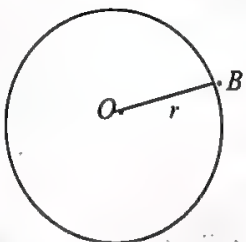
$$\text{Length of arc } (AB) = \frac{\theta}{360^\circ} \times 2\pi r$$

$$\text{Perimeter of sector } (OAB) = 2r + \text{length of arc}$$

$$\text{Area of sector} = \frac{\theta}{360^\circ} \times \pi r^2$$

Circle

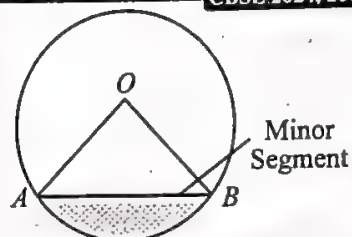
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$$\begin{aligned} \text{Circumference of the circle} &= 2\pi r \\ \text{Area of the circle} &= \pi r^2 \end{aligned}$$

Segment of circle

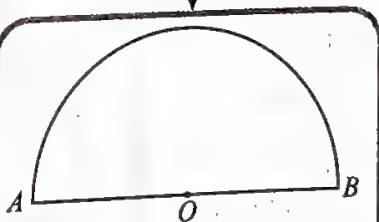
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$$\text{Length of chord } (AB) = 2r \sin\left(\frac{\theta}{2}\right)$$

$$\begin{aligned} \text{Area of segment} &= \text{Area of sector } (OAB) \\ &\quad - \text{Area of } \Delta OAB \\ &= \frac{\theta}{360^\circ} \times \pi r^2 - \frac{1}{2} r^2 \sin \theta \end{aligned}$$

Semi-Circle



$$\begin{aligned} \text{Perimeter of the semi-circle} &= \pi r + 2r \\ \text{Area of the semi-circle} &= \frac{1}{2} \pi r^2 \end{aligned}$$

CHAPTER-12

SURFACE AREAS AND VOLUMES



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The capacity occupied
by a 3-D solid shape

Volume

Combination of Solids

Surface area is
the space which is
occupied by a solid

Surface
Areas
and
Volumes

Surface Area

Formula

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| Name of Solid | Volume (V) | Curved Surface Area (C.S.A) | Total Surface Area (T.S.A) |
|--|------------------------|-----------------------------|----------------------------|
| Cube | a^3 | $4a^2$ | $6a^2$ |
| Cuboid | $l \times b \times h$ | $2h(l+b)$ | $2(lb+bh+hl)$ |
| Sphere | $\frac{4}{3}\pi r^3$ | $4\pi r^2$ | $4\pi r^2$ |
| Hemisphere | $\frac{2}{3}\pi r^3$ | $2\pi r^2$ | $3\pi r^2$ |
| Right Circular Cylinder | $\pi r^2 h$ | $2\pi rh$ | $2\pi r(h+r)$ |
| Right Circular Hollow Cylinder ($R > r$) | $\pi(R^2 - r^2)h$ | $2\pi(R+r)h$ | $2\pi(R+r)(h+R-r)$ |
| Cone | $\frac{1}{3}\pi r^2 h$ | πrl | $\pi r(l+r)$ |



$$\text{T.S.A} = (\text{C.S.A})_{\text{Cylinder}} + (\text{C.S.A})_{\text{Cone}} + (\text{Base Area})_{\text{Cylinder}}$$

$$\text{Volume} = (\text{Volume})_{\text{Cone}} + (\text{Volume})_{\text{Cylinder}}$$



$$\text{T.S.A} = (\text{C.S.A})_{\text{Cone}} + (\text{C.S.A})_{\text{Hemisphere}}$$

$$\text{Volume} = (\text{Volume})_{\text{Cone}} + (\text{Volume})_{\text{Hemisphere}}$$



$$\text{T.S.A} = (\text{T.S.A})_{\text{Cube}} + (\text{C.S.A})_{\text{Hemisphere}} - (\text{Base Area})_{\text{Hemisphere}}$$

$$\text{Volume} = (\text{Volume})_{\text{Cube}} + (\text{Volume})_{\text{Hemisphere}}$$



$$\text{T.S.A} = (\text{T.S.A})_{\text{Cube}} + (\text{T.S.A})_{\text{Cylinder}} - (\text{Base Area})_{\text{Cylinder}}$$

$$\text{Volume} = (\text{Volume})_{\text{Cube}} + (\text{Volume})_{\text{Cylinder}}$$



$$\text{T.S.A} = (\text{T.S.A})_{\text{Cube}} + (\text{C.S.A})_{\text{Cone}} - (\text{Base Area})_{\text{Cone}}$$

$$\text{Volume} = (\text{Volume})_{\text{Cube}} + (\text{Volume})_{\text{Cone}}$$

CHAPTER-13

STATISTICS

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Data:
Facts, observations and information that come from investigations are known as data.

Class width = $\frac{\text{Lower limit} + \text{Upper limit}}{2}$

Mean:
The arithmetic mean is the sum of the values of all the observations divided by total number of observations.

$$\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

Direct Method

$$\text{Mean } \bar{x} = \frac{\sum_{i=1}^n f_i x_i}{\sum_{i=1}^n f_i}$$

Assumed Mean Method

$$\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$$

Step-deviation Method

$$\bar{x} = a + \frac{\sum f_i u_i}{\sum f_i} \times h$$

Median Class:

Median class is just greater than $\frac{N}{2}$ is called median class where N is sum of frequencies i.e. $N = \sum f_i$

Grouped Data:

Grouped data is a data given in the form of class intervals 0-5, 5-10, 10-15,...etc.

Mode:

Mode is the value of the observation having the maximum frequency.

Modal Class:

Class having maximum frequency called modal class.

Mode = $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

f_1 = frequency of the modal class

f_0 = frequency of the class preceding the modal class

f_2 = frequency of the class succeeding the modal class

h = size of class interval

l = lower limit of the modal class

Median:

The middle most value of the given data set when it is arranged in either ascending or descending order of magnitude is called median.

Median:

If total number of observations is odd, say n . Then,

Median = value of $\left(\frac{n+1}{2} \right)^{\text{th}}$ observation.

If total number of observations is even, say n . Then,

Median = $\frac{\text{Value of } \left(\frac{n}{2} \right)^{\text{th}} \text{ term} + \text{Value of } \left(\frac{n}{2} + 1 \right)^{\text{th}} \text{ term}}{2}$

$$\text{Median} = l + \left(\frac{\frac{N}{2} - Cf}{f} \right) \times h$$

l = lower limit of median class interval

Cf = Cumulative frequency preceding to the median

f = frequency of the class interval to which median belongs.

h = size of class interval

CHAPTER-14

PROBABILITY

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Most

(An

Note: Questions in this section

1.

- Let p be a prime
(a) p
(c) $p + 1$
- If the HCF of $85n - 153$, the
(a) 3
(c) 4
- If two positive integers a and $b = p^2q^3$,
HCF(a, b) = $(r + s)$ equal
(a) 15
(c) 35
- The smallest number which leaves a remainder of 1 when divided by 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
(a) 493
(c) 11339
- The LCM of two numbers cannot be their product
(a) 400
(c) 600
- The least number which is divisible by all the numbers from 1 to 10 (both inclusive)
(a) 10
(c) 504

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- Both Assertion (A) and Reason (R) are true
- Both Assertion (A) and Reason (R) are false
- Assertion (A) is true but Reason (R) is false
- Assertion (A) is false but Reason (R) is true

7. A number n is a prime number. Assertion Reason

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Complementary Event

When there are two events such that one event can occur if and only if the other does not take place then such events are known as complementary events in probability. The sum of the probability of complementary events will always be equal to 1. The complement of A is denoted by \bar{A} .

Compound Event

An event which has more than one elementary event is called a compound event.

For example, the probability of rolling an even number on a die, then tossing a head on a coin.

Impossible Event

The events whose probability is zero are called impossible events.

For example, the event of drawing a black ball from a bag containing three red and four white balls is an impossible event.

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Elementary Event

An event having only one outcome or any single outcome of an experiment is called an elementary event.

For example, the probability of getting a 3 when a die is tossed.

- Sum of probability of all elementary events is 1.

Event

A desired outcome of the random experiment is known as an event of the random experiment e.g., Getting a tail on tossing a coin, getting a red card when a card is drawn from a pack of 52 cards.

Sure or Certain Event

The events whose probability is one are called sure/certain events.

For example, the event of drawing a black ball from a bag containing ninety red balls is a sure event.

Experiment: An experiment refers to a specific action or process that produces an outcome. For example, tossing a coin, rolling a die, or selecting a card from a deck.

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Definition: Probability is the branch of mathematics that deals with the study of random events or outcomes. It is the measure of the likelihood or chance that an event will occur.

Probability

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Theoretical Probability

The theoretical (or classical) probability of an event E is given by

$$P(E) = \frac{\text{Number of outcomes favourable to } E}{\text{Number of all possible outcomes of the experiment}}$$

Experimental Probability

The experimental (or empirical) probability of an event E is given by

$$P(E) = \frac{\text{Number of trials in which the event happened}}{\text{Total number of trials}}$$

Most Probable Questions (Analyzed & Selected)

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Note: Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.

1. Real Numbers

- Let p be a prime number. The sum of its factors is
(a) p (b) 1
(c) $p+1$ (d) $p-1$
- If the HCF of 85 and 153 is expressible in the form $85n - 153$, then the value of n is
(a) 3 (b) 2
(c) 4 (d) 1
- If two positive integers a and b are written as $a = p^3q^4$ and $b = p^2q^3$, where p and q are prime numbers, such that $\text{HCF}(a, b) = p^m q^n$ and $\text{LCM}(a, b) = p^r q^s$ then $(m+n)(r+s)$ equal to
(a) 15 (b) 30
(c) 35 (d) 72
- The smallest number which when divided by 17, 23 and 29 leaves a remainder 11 in each
(a) 493 (b) 11350
(c) 11339 (d) 667
- The LCM of two numbers is 1200. Which of the following cannot be their HCF?
(a) 400 (b) 500
(c) 600 (d) 300
- The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
(a) 10 (b) 100
(c) 504 (d) 2520

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 - Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 - Assertion (A) is true, but Reason (R) is false.
 - Assertion (A) is false, but Reason (R) is true.
- A number q is prime factorised as $3^2 \times 7^2 \times b$, where b is a prime number other than 3 and 7.
Assertion (A): q is definitely an odd number.
Reason (R): $3^2 \times 7^2$ is an odd number.

- Assertion (A): 5^n can never end with digit '0' for any Natural number n .

Reason (R): The prime factorisation of 5^n does not contain the prime numbers 2 and 5.

- The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one of the numbers is 280. Find the other number.
- On a morning walk, three person's steps off together and their steps measure 40 cm, 42 cm, and 45 cm respectively. What is the minimum distance each should walk, so that each can cover the same distance in complete steps?
- In seminar, the no. of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being of the same subject.
- Prove that $\sqrt{3} + \sqrt{5}$ is irrational.
- Prove that $\sqrt{5}$ is an irrational number.
- Prove that $6 + 2\sqrt{5}$ is an irrational number. It is given that $\sqrt{5}$ is an irrational number.

Competency Based Questions

- National Art convention got registrations from students from all parts of the country, of which 60 are interested in music, 84 are interested in dance and 108 students are interested in handicrafts. For optimum cultural exchange, organisers wish to keep them in minimum number of groups such that each group consists of students interested in the same artform and the number of students in each group is the same. Find the number of students in each group. Find the number of groups in each art form. How many rooms are required if each group will be allotted a room?
(CBSE SQP, 2023)
- Grow More Plantations have two rectangular fields of the same width but different [2] lengths. They are required to plant 84 trees in the smaller field and 231 trees in the larger field. In both fields, the trees will be planted in the same number of rows but in different numbers of columns.
(i) What is the most number of rows that can be planted in this arrangement? Show your work.
(ii) If the trees are planted in the number of rows obtained in part (i), how many columns will each field have?
(CBSE CFPQ, 2023)

17. A school Principal wants to address the students of classes eighth to tenth on the importance of personal hygiene. He asks the teacher in charge of the school to arrange all the students of eighth, ninth and tenth classes in a single hall. There are 84 students from eighth class, 63 students from ninth and 42 students from tenth class.



Based on the above information, answer the following questions:

- What is the minimum number of rows in which the students can be seated such that students belonging to the same class are seated in the same row?
- Three numbers are in the ratio of 3 : 4 : 5 and their L.C.M is 2400. The H.C.F of the numbers is:

OR

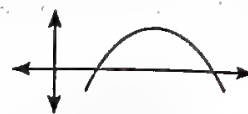
The product of two numbers is 2028 and their H.C.F is 13. The L.C.M of the numbers is:

- Realizing that the hall can accommodate more students, the school Principal now wants to include 98 students of class seventh also. What will be the number of students and minimum number of rows such that students belonging to the same class are seated in the same row?

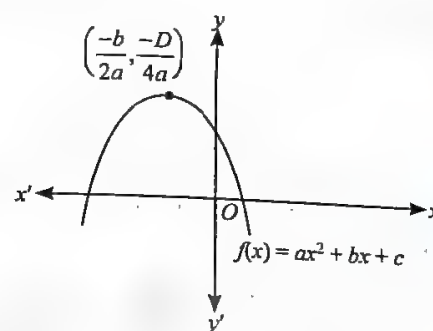
2. Polynomials

- If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is
(a) 10 (b) -10
(c) 5 (d) -5
- If one zero of the polynomial $P(x) = 5x^2 + 13x + K$ is reciprocal of the other, then value of k is
(a) 0 (b) 5
(c) $\frac{1}{6}$ (d) 6
- If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then
(a) $a = -7, b = -1$
(b) $a = 5, b = -1$
(c) $a = 2, b = -6$
(d) $a = 0, b = -6$

4. The quadratic polynomial $ax^2 + bx + c, a \neq 0$ is represented by this graph then a is



- Natural no. (b) Whole no.
 - Negative Integer (d) Irrational no.
5. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are
(a) Both positive
(b) both negative
(c) One positive and one negative
(d) both equal
6. In Given figure show the graph of the polynomial $f(x) = ax^2 + bx + c$.



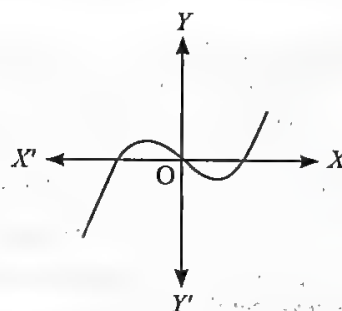
Which of the following option is correct?

- $a < 0, b < 0$ and $c > 0$ (b) $a < 0, b < 0$ and $c < 0$
(c) $a < 0, b > 0$ and $c > 0$ (d) $a < 0, b > 0$ and $c < 0$

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true, but Reason (R) is false.
- Assertion (A) is false, but Reason (R) is true.

7. Assertion (A): The graph of $y = f(x)$ is shown in figure for the polynomial $f(x)$. The number of zeroes of $f(x)$ is 3.



Reason (R): The number of zeroes of the polynomial $f(x)$ is the number of points at which $f(x)$ cuts or touches the x-axis.

8. **Assertion (A):** The sum and product of the zeroes of a quadratic polynomial are $-\frac{1}{4}$ and $\frac{1}{4}$ respectively.

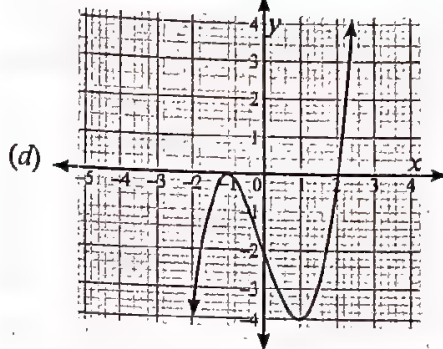
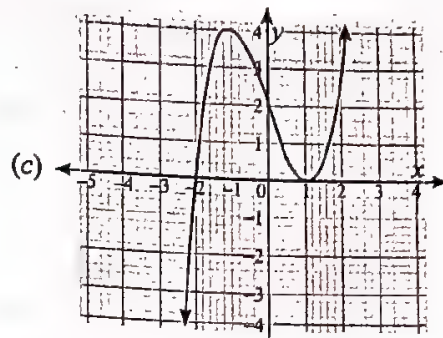
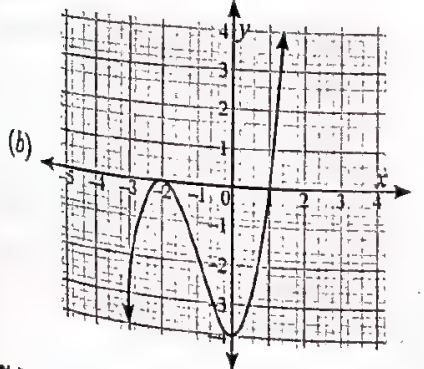
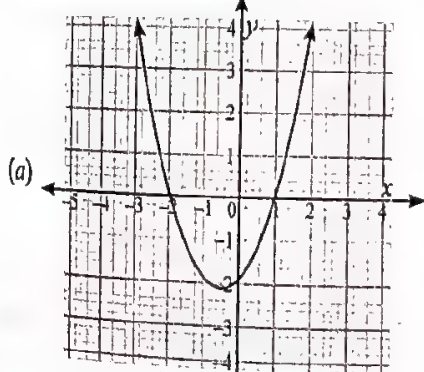
Then the quadratic polynomial is $2x^2 + \frac{x}{2} + \frac{1}{2}$.

Reason (R): The quadratic polynomial whose sum and product of zeroes are given is $x^2 - (\text{sum of zeroes})x + (\text{product of zeroes})$.

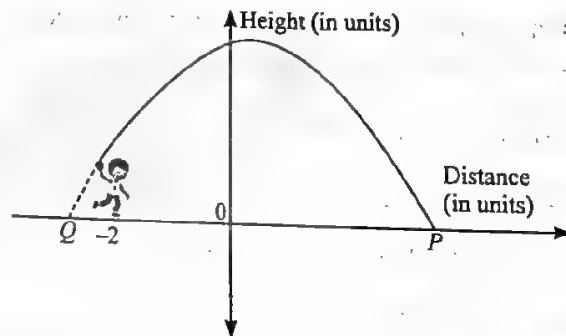
9. If α and β are the zeroes of the polynomial $p(x) = x^2 - p(x+1) - c$ such that $(\alpha+1)(\beta+1) = 0$, then find the value of c .
10. Find the quadratic polynomial whose zeroes are $(5+2\sqrt{3})$ and $(5-2\sqrt{3})$.
11. What will be the number of zeroes of the polynomials whose graphs are either touching or intersecting the axis only at the points: (i) $(-3, 0)$, $(0, 2)$ & $(3, 0)$ (ii) $(0, 4)$, $(0, 0)$ and $(0, -4)$
12. If α and β are the zeroes of the polynomial $x^2 - 5x + m$ such that $\alpha - \beta = 1$, find m .
13. If m and n are the zeroes of the polynomial $3x^2 + 11x - 4$, find the value of $\frac{m}{n} + \frac{n}{m}$.
14. Obtain zeroes of $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ and verify relation between its zeroes and coefficients.
15. If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 5x + k$, satisfying the relation $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$ the find the value of k .
16. Find the zeroes of the polynomial $x^2 - 3x - m(m+3)$.

Competency Based Questions

17. Which of the following could be the graph of the polynomial $(x-1)^2(x+2)$? (CBSE APQ, 2023)

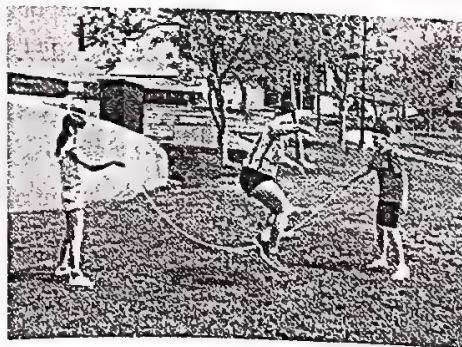


18. Riddhi throws a stone in the air such that it follows a parabolic path before it lands at P on the ground as depicted by the graph below.



(Note: The figure is not to scale.)

- (i) The above graph is represented by a polynomial where the sum of its zeroes is 1 and the sum of the squares of its zeroes is 25. Find the coordinates of P and Q .
- (ii) If one unit on the graph represents 25 metres, how far from Riddhi does the stone land? (CBSE SQP, 2023)
19. The skipping rope while skipping looks like a form of parabola. It is a natural example of parabolic shape which is represented by a quadratic polynomial. Similarly there are other examples as well related to polynomials.



(i) Find the value of x for which the graph of $p(x) = x^2 - 2$, intersects the x -axis.

(ii) If α and $\frac{1}{\alpha}$ are the zeroes of the quadratic polynomial $p(x) = 3x^2 - 2x + 5k$, then find the value of k :

OR

Find quadratic polynomial having sum and product of zeroes as α and $\frac{-1}{\alpha}$ respectively:

(iii) If α and β are the zeroes of the polynomial $p(x) = ax^2 + bx + c$, then find $\alpha^2\beta + \beta^2\alpha$

3. Pair of Linear Equations in Two Variables

- The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have infinitely many solutions is
(a) 3 (b) -3
(c) -12 (d) no value
- One equation of a pair of dependent linear equations is $-5x + 7y = 2$. The second equation can be
(a) $10x + 14y + 4 = 0$
(b) $-10x - 14y + 4 = 0$
(c) $-10x + 14y + 4 = 0$
(d) $10x - 14y = -4$
- If $ax + by = c$ and $lx + my = n$ has unique solution then the relation between the coefficient will be
(a) $am \neq lb$ (b) $am = lb$
(c) $ab = lm$ (d) $ab \neq lm$

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 - Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
 - Assertion (A) is true but Reason (R) is false.
 - Assertion (A) is false but Reason (R) is true.
4. **Assertion (A):** If $x = 3, y = 1$ is the solution of the line $2x + y - q^2 - 3 = 0$, then the value of $q = \pm 2$.
Reason (R): The solutions of the line will satisfy the equation of the line.

5. **Assertion (A):** The value of k for which the system of equations $kx - y = 2, 6x - 2y = 3$ has a unique solution

Reason (R): The system of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has a unique solution if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

6. Solve the following pair of linear equations:

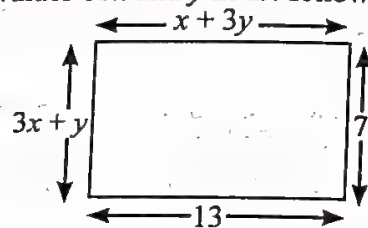
$$21x + 47y = 110$$

$$47x + 21y = 162$$

7. For which values of a and b , will the following system of linear equations have infinitely many solutions?
 $x + 2y = 1$

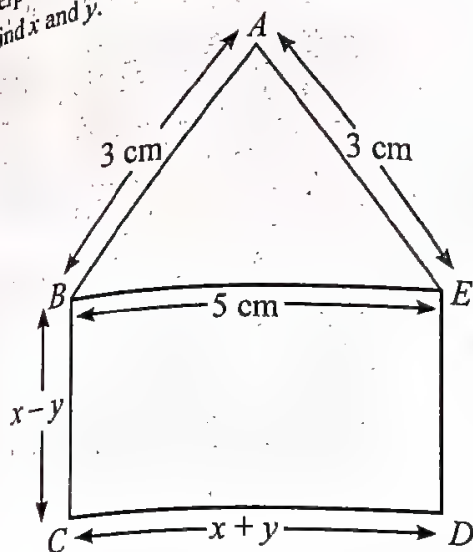
$$(a - b)x + (a + b)y = a + b - 2$$

8. Find the values of x and y in the following rectangle



- The age of the father is twice the sum of the ages of two children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.
- There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls.
- The angles of a cyclic quadrilateral ABCD are $\angle A = (6x + 10)^\circ, \angle B = (5x)^\circ, \angle C = (x + y)^\circ, \angle D = (3y - 10)^\circ$. Find x and y , and hence the values of the four angles.
- A two-digit number is obtained by either multiplying the sum of the digits by 8 or then subtracting 5 or multiplying the difference of the digits by 16 and then adding 3. Find the number.
- A railway half ticket costs half the full fare, but the reservation charges are the same on a half ticket as on a full ticket. One reserved first class ticket from the station A to B costs Rs 2530. Also, one reserved first class ticket and one reserved first class half ticket from A to B cost Rs 3810. Find the full first class fare from station A to B and also the reservation charges for a ticket.
- Vijay had some bananas, and he divided them into two lots A and B. He sold the first lot at the rate of Rs 2 for 3 bananas and the second lot at the rate of Rs 1 per banana, and got a total of Rs 400. If he had sold the first lot at the rate of Rs 1 per banana, and the second lot at the rate of Rs 4 for 5 bananas, his total collection would have been Rs 460. Find the total number of bananas he had.

15. $ABCDE$ is a pentagon with $BE \parallel CD$ and $BC \parallel DE$, BC is perpendicular to CD if the perimeter of $ABCDE$ is 21 cm, Find x and y .



Competency Based Questions

16. Given below is a non-linear equation.

$$\frac{3(x+y)+7(x-y)}{x^2-y^2} = 12$$

Garima has reduced it to a linear equation in two variables. Shown below are her steps.

Step 1: $\frac{3(x+y)+7(x-y)}{(x+y)(x-y)} = 12$

Step 2: $\frac{3}{(x+y)} + \frac{7}{(x-y)} = 12$

Step 3: Takes $\frac{1}{(x+y)} = a$ and $\frac{1}{(x-y)} = b$

Step 4: $3a + 7b = 12$ (CBSE CFPQ, 2023)

However, she has made a mistake in one step. Identify the erroneous step and complete the solution.

17. Arvind owns a dry-fruits store. He sells cashew nuts at ₹600/kg and pistachio nuts at ₹750/kg.

A customer asks for a mixture of cashew nuts and pistachio nuts with the following conditions:

- Both the items should together weigh 500g.
- Both the items should together cost ₹360.

- (i) If Arvind packs x kg of cashew nuts and y kg of pistachio nuts for the customer, frame the equations that represent the given context.

- (ii) Find the weights of cashew nuts and pistachio nuts that Arvind packed for the customer. Show your work.

18. Mr. RK Agrawal is the owner of a famous amusement park in Delhi. The ticket charge for the park is ₹ 150 for children and ₹ 400 for adults.



Generally, he does not go to the park and it is managed by a team of staff. One day Mr. Agrawal decided to randomly check the park and went there. When he checked the cash counter, he found that 480 tickets were sold and ₹ 134500 was collected

- (i) Let the number of children visited be x and the number of adults visited be y . What is the pair of equations that models the problem?
(ii) How many children visited the park?

OR

How much money would have been collected if 300 children and 350 adults had visited the park?

- (iii) How much more/less would have been collected if the price of the ticket for children and adult had ₹200 and ₹300 respectively.

4. Quadratic Equations

1. Which of the following equations has 2 as a root?

- (a) $x^2 - 4x + 5 = 0$ (b) $x^2 + 3x - 12 = 0$
(c) $2x^2 - 7x + 6 = 0$ (d) $3x^2 - 6x - 2 = 0$

2. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is

- (a) 2 (b) -2
(c) $\frac{1}{4}$ (d) $\frac{1}{2}$

Direction: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

3. **Assertion (A):** If one root of the quadratic equation $6x^2 - x - k = 0$ is $2/3$, then the value of k is 2.

Reason (R): The quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has almost two roots.

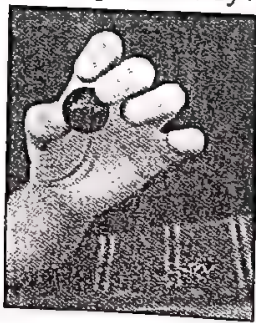
4. **Assertion (A):** $3x^2 - 6x + 3 = 0$ has repeated roots.

Reason (R): The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant $D > 0$.

5. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots find the value of k .
6. Solve for x : $4x^2 + 4bx - (a^2 - b^2) = 0$
7. Solve for x : $4x^2 - 2(a^2 + b^2) + a^2b^2 = 0$
8. If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than five times her actual age. What is her age now?
9. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.
10. If the price of a book is reduced by rs.5, a person can buy 5 more books for rs. 300. Find the original list price of the book.
11. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the duration of flight.
12. The speed of a boat in still water is 15 km/hr. It can go 30 km upstream and return downstream to the original point in 4 hrs 30 minutes. Find the speed of the stream.
13. If the equation $(1 + m^2)n^2x^2 + 2mncx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.
14. The difference of two natural numbers is 3 and the difference of their reciprocals is $\frac{3}{28}$. Find the numbers.

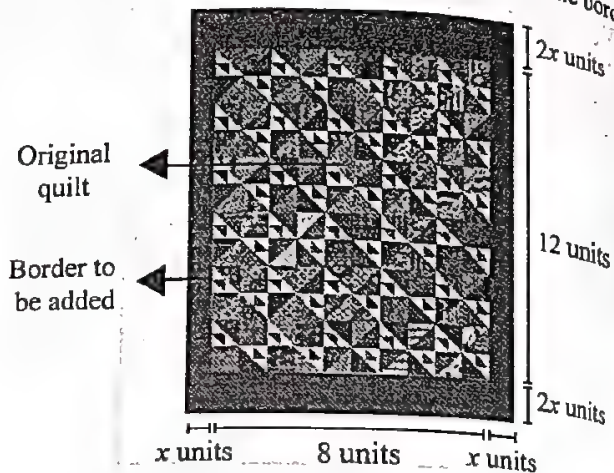
Competency Based Questions

15. When a marble is dropped from an initial height, d metres, with an initial speed, v m/s, the height of the marble at time t is represented by $h(t) = vt - 2t^2 + d$.

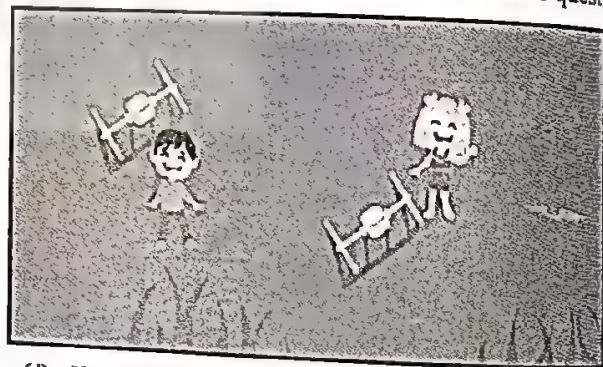


A marble is dropped from a height of 48 m with an initial speed, 10 m/s. How long does it take for the marble to hit the ground? Show your steps and give valid reasons.

16. A quilt maker has a rectangular quilt measuring 12 units by 8 units. He wants to add a border to it as shown in the figure below. He has 64 sq units of fabric for the border.



- (i) If x and $2x$ are the widths of the border as shown, frame a quadratic equation using the total area enclosed by the new quilt (with the border).
- (ii) Find the measures of the new quilt (with the border).
17. Suppose a company wants to construct a rectangular park. If length that is 25 meters longer than the width. The area of the park should be 600 square meters. To determine the length of the park, the company needs to solve a quadratic equation. Read the following and answer the questions.



- (i) What is the quadratic equation that represents the area of the rectangular park?
- (ii) What is the length of the rectangular park?

OR

What is the value of the discriminant of the quadratic equation?

- (iii) What is the value of the coefficient of x^2 in the quadratic equation?

5. Arithmetic Progressions

1. What is the common difference of an A.P. in which $a_{18} - a_{14} = 32$?
- (a) 8 (b) -8
- (c) -4 (d) 4

Direction: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true, but Reason (R) is false.
- Assertion (A) is false, but Reason (R) is true.

2. Assertion (A): $-5, -\frac{5}{2}, 0, \frac{5}{2}$ is in Arithmetic Progression.

Reason (R): The terms of an Arithmetic Progression cannot have both positive and negative rational numbers.

(CBSE SQP, 2023)

3. Assertion (A): Sum of first hundred even natural numbers divisible by 5 is 500.

Reason (R): Sum of first n terms of an AP is given by

$$S_n = \frac{n}{2}[a + l], \text{ } l \text{ is last term}$$

4. Which term of the A.P. 5, 15, 25, will be 130 more than its 31st term?

5. If 10 times of 10th term is equal to 20 times of 20th term of an A.P. Find its 30th term.

6. Solve $1 + 4 + 7 + 10 + \dots + x = 287$

7. If $\frac{1}{x+2}, \frac{1}{x+3}$ and $\frac{1}{x+5}$ are in A.P. find x .

8. In an A.P. find S_n , where $a_n = 5n - 1$. Hence find the sum of the first 20 terms.

9. Which term of the A.P. : 121, 117, 113... is the first negative terms?

10. Find the middle terms of the A.P. 7, 13, 19, 241.

11. If the m^{th} term of an A.P. be $\frac{1}{n}$ and n^{th} term be $\frac{1}{m}$, show that its $(mn)^{\text{th}}$ is 1.

12. If the p^{th} term A.P. is q and the q^{th} term is p , prove that its n^{th} term is $(p + q - n)$.

13. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

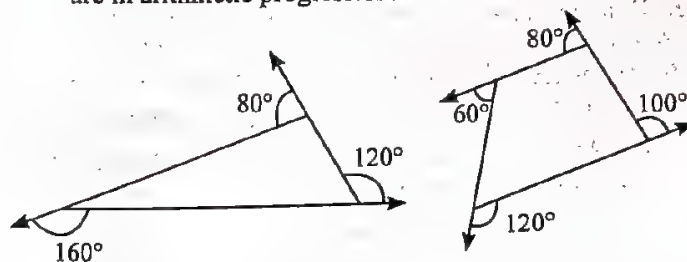
14. The sum of four consecutive numbers in A.P. is 32 and the ratio of the product of the first and last term to the product of two middle terms is 7 : 15. Find the numbers.

15. If the ratio of the sum of the first n terms of two APs is $(7n + 1) : (4n + 27)$ then find the ratio of their 9th terms.

16. A thief runs with a uniform speed of 100m/min. After 1 minute, a policeman runs after the thief to catch him. He runs with a speed of 100 m/min in the first minute and increases his speed by 10 m/m in every succeeding minute. After how many minutes will the policeman catch the thief?

Competency Based Questions

17. The exterior angles marked in each of the polygons below are in arithmetic progression.



Minal drew one such polygon with n sides. The smallest exterior angle is 8° and each subsequent angle is 4° more than the previous angle.

Find the number of sides of the polygon that Minal had drawn. Show your steps. (CBSE CFPQ, 2023)

18. Priya is preparing for the Bicycle Marathon. Her racing bicycle has a device to calculate the number of kilometres she cycled. She decides to increase the distance she cycles everyday by a fixed number of kilometres.

(i) On the first day Priya cycled 8 km. In 10 days she cycled a total of 170 km. How many kilometres did she cycle on the 3rd day?

(ii) Priya plans to go on a cycle tour from Bangalore to Mangalore covering 425 km. She travels 20 km on day 1 and increases the distance covered each day by 5 km. In how many days will she reach her destination?

(CBSE CFPQ, 2023)

19. An interior designer, Sana, hired two painters, Manan and Bhima to make paintings for her buildings. Both painters were asked to make 50 different paintings each.

The prices quoted by both the painters are given below:

- Manan asked for ₹6000 for the first painting, and an increment of ₹200 for each following painting.
- Bhima asked for ₹4000 for the first painting, and an increment of ₹400 for each following painting.

(CBSE APQ, 2023)

Answer the questions based on the given information.

- How much money did Manan get for his 25th painting? Show your work.
- How much money did Bhima get in all? Show your work.
- If both Manan and Bhima make paintings at the same pace, find the first painting for which Bhima will get more money than Manan. Show your steps.

OR

Sana's friend, Aarti hired Manan and Bhima to make paintings for her at the same rates as for Sana. Aarti had both painters make the same number of paintings, and paid them the exact same amount in total.

How many paintings did Aarti get each painter to make? Show your work.

6. Triangles

- If in two $\triangle ABC$ and $\triangle PQR$, $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$ then
 - $\triangle PQR \sim \triangle CAB$
 - $\triangle PQR \sim \triangle ABC$
 - $\triangle CBA \sim \triangle PQR$
 - $\triangle BCA \sim \triangle PQR$
- In $\triangle ABC$ and $\triangle DEF$, $\angle B = \angle E$, $\angle F = \angle C$, and $AB = 3DE$. Then, the two triangles are
 - Congruent but not similar
 - Similar but not congruent
 - Neither congruent nor similar
 - Congruent as well as similar
- If in triangles ABC and DEF , $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when
 - $\angle B = \angle E$
 - $\angle A = \angle D$
 - $\angle B = \angle D$
 - $\angle A = \angle F$

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true but Reason (R) is false.
- Assertion (A) is false but Reason (R) is true.

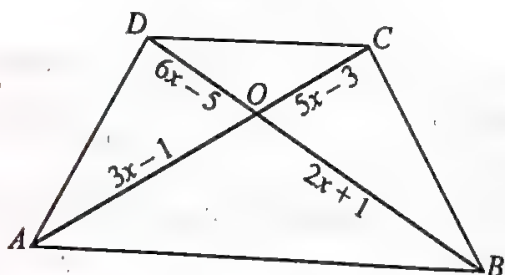
- Assertion (A):** If in a $\triangle ABC$, a line $DE \parallel BC$, intersects AB in D and AC in E , then $\frac{AB}{AD} = \frac{AC}{AE}$.

Reason (R): If a line is drawn parallel to one side of a triangle intersecting the other two sides, then the other two sides are divided in the same ratio.

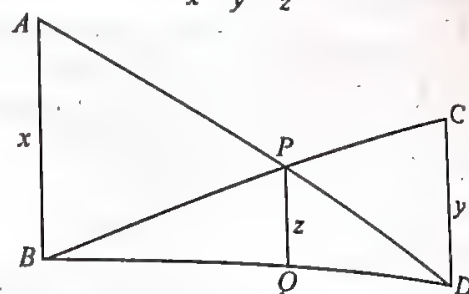
- Assertion (A):** In $\triangle ABC$, $DE \parallel BC$ such that $AD = (7x - 4)$ cm, $AE = (5x - 2)$ cm, $DB = (3x + 4)$ cm and $EC = 3x$ cm then x is equal to 4.

Reason (R): Pythagoras theorem says that if a line is drawn parallel to one side of a triangle intersecting the other two sides, then the other two sides are divided in the same ratio.

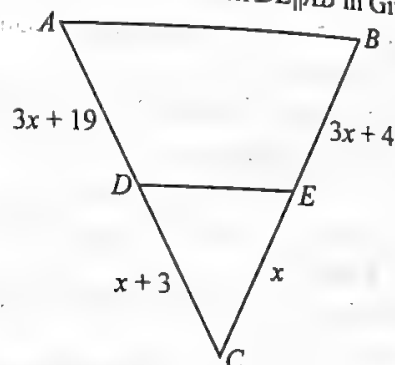
- In the given fig., $AB \parallel DC$ and diagonals AC and BD intersect at O . If $OA = 3x - 1$ and $OB = 2x + 1$, $OC = 5x - 3$ and $OD = 6x - 5$, find the value of x .



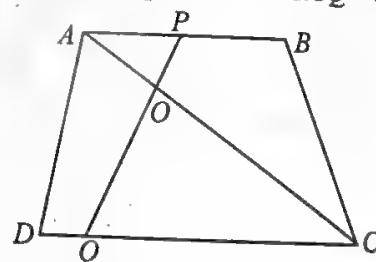
- In the given figure $AB \parallel PQ \parallel CD$, $AB = x$, $CD = y$ and $PQ = z$. Prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$.



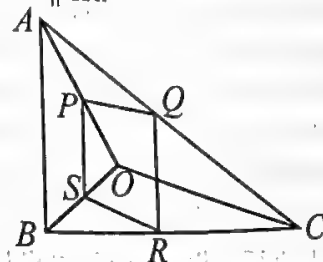
- Legs (sides other than the hypotenuse) of a right triangle are of lengths 16 cm and 8 cm. Find the length of the side of the largest square that can be inscribed in the triangle.
- Find the value of x for which $DE \parallel AB$ in Given Fig



- In Given Fig. if $AB \parallel DC$ and AC and PQ intersect each other at the point O , prove that $OA \cdot CQ = OC \cdot AP$.

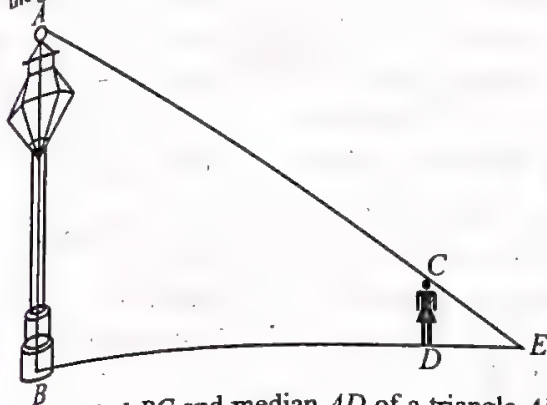


- If $\triangle ABC \sim \triangle DEF$, $AB = 4$ cm, $DE = 6$ cm, $EF = 9$ cm and $FD = 12$ cm, find the perimeter of $\triangle ABC$.
- $ABCD$ is a trapezium in which $AB \parallel DC$ and P and Q are points on AD and BC , respectively such that $PQ \parallel DC$. If $PD = 18$ cm, $BQ = 35$ cm and $QC = 15$ cm, find AD .
- In Given Fig. If $PQRS$ is a parallelogram and $AB \parallel PS$, then prove that $OC \parallel SR$.

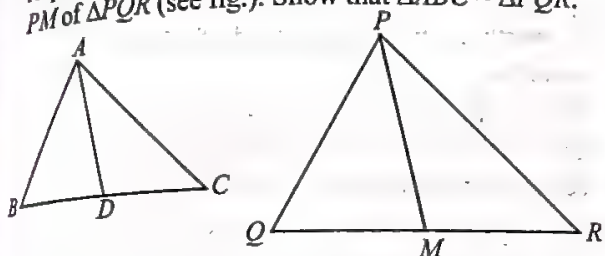


- Diagonals AC and BD of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point O . Using a similarity criterion for two triangles, show that $\frac{AO}{OC} = \frac{OB}{OD}$.

15. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

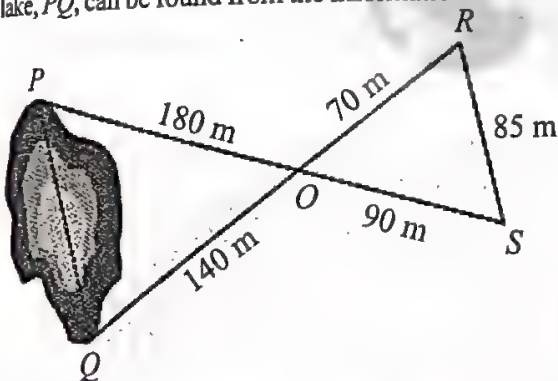


16. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$ (see fig.). Show that $\triangle ABC \sim \triangle PQR$.



Competency Based Questions

17. A geologist asked his assistant Nidhi, if the length of the lake, PQ , can be found from the information shown below.



Nidhi said, "It is possible to find the length of the lake, PQ ."

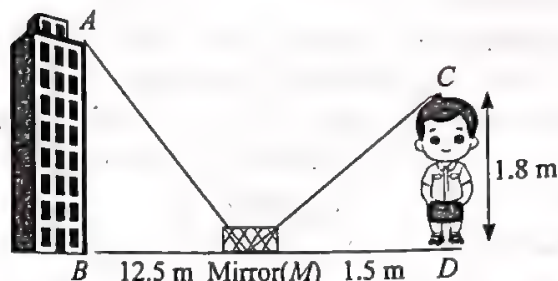
Is Nidhi's statement correct? Justify your answer with valid reasons.

18. In a city park, two similar triangular flower beds, Triangle ABC and Triangle DEF , are designed such that the ratio of the perimeter of $\triangle ABC$ to the perimeter of $\triangle DEF$ is 5:7.

(i) John claims that $\frac{AB}{DE} = \frac{5}{7}$. Is his claim true? Justify your answer.

(ii) If the length of the side AB is 10 m, find the length of the side DE .

19. Rohit's dad, who is good at mathematics, gave him a fun task to measure a building's height. Rohit used a mirror on the ground for this task. He stood at a spot where he could see the top of the building in the mirror. Rohit's eyes are 1.8 meters above the ground. He is standing 1.5 meters away from the mirror, and the building is 2.5 meters away from the mirror.



Based on the above information, answer the following questions:

- Apply your understanding of similar triangles and proportions to determine the height of the building.
- Use your knowledge of angles in triangles to find the value of $\angle MCD$, given that in $\triangle ABM$, $\angle BAM = 30^\circ$.
- If $\triangle ABM$ and $\triangle CDM$ are similar, with $CD = 6$ cm, $MD = 8$ cm, and $BM = 24$ cm, calculate the length of AB .

7. Coordinate Geometry

- The distance of the point $P(-6, 8)$ from the origin is
(a) 8 (b) $2\sqrt{7}$
(c) 10 (d) 6
- The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is
(a) 5 (b) 11
(c) 12 (d) $7 + \sqrt{5}$
- The points $(-4, 0)$, $(4, 0)$, $(0, 3)$ are the vertices of a
(a) Right triangle (b) isosceles triangle
(c) Equilateral triangle (d) scalene triangle
- The point which divides the line segment joining the points $(7, -6)$ and $(3, 4)$ in ratio 1 : 2 internally lies in the
(a) I quadrant (b) II quadrant
(c) III quadrant (d) IV quadrant
- The fourth vertex D of a parallelogram $ABCD$ whose three vertices are $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is
(a) $(0, 1)$ (b) $(0, -1)$
(c) $(-1, 0)$ (d) $(1, 0)$

6. If the distance between the points $(4, p)$ and $(1, 0)$ is 5, then the value of p is

(a) 4 only (b) $\neq 4$
(c) -4 only (d) 0

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

7. **Assertion (A):** The distance point $P(2, 3)$ from the x -axis is 3.

Reason (R): The distance from x -axis is equal to its ordinate.

8. **Assertion (A):** The co-ordinates of the point which divides the join of $A(-5, 11)$ and $B(4, -7)$ in the ratio $7 : 2$ is $(2, -3)$

Reason (R): The coordinates of the point $P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)$ and

$B(x_2, y_2)$ in the ratio $m_1 : m_2$ is $\left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$.

9. If the distances of $P(x, y)$ from $A(5, 1)$ and $B(-1, 5)$ are equal then prove that $3x = 2y$.
10. If $P(9a - 2, -b)$ divides line segment joining $A(3a + 1, -3)$ and $B(8a, 5)$ in the ratio $3 : 1$, find the values of a and b .
11. If (a, b) is the mid-point of the line segment joining the points $A(10, -6)$ and $B(k, 4)$ and $a - 2b = 18$, find the value of k and the distance AB .
12. The line segment joining the points $A(3, 2)$ and $B(5, 1)$ is divided at the point P in the ratio $1 : 2$ and it lies on the line $3x - 18y + k = 0$. Find the value of k .
13. The points $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are the vertices of $\triangle ABC$.
(i) The median from A meets BC at D . Find the coordinates of the point D .
(ii) Find the coordinates of the point P on AD such that $AP : PD = 2 : 1$
14. The line segment joining the points $A(2, 1)$ and $B(5, -8)$ is trisected at the points P and Q such that P is nearer to A . If P also lies on the line given by $2x - y + k = 0$, find the value of k .

Competency Based Questions

15. On a golf course, three holes $A(-6, -1)$, B and $C(9, -4)$ lie on a straight line in that order. The distance between B and C is two times that between B and A .

Rahul strikes the ball, which is at point $P(2, 3)$, such that it goes in the hole B .

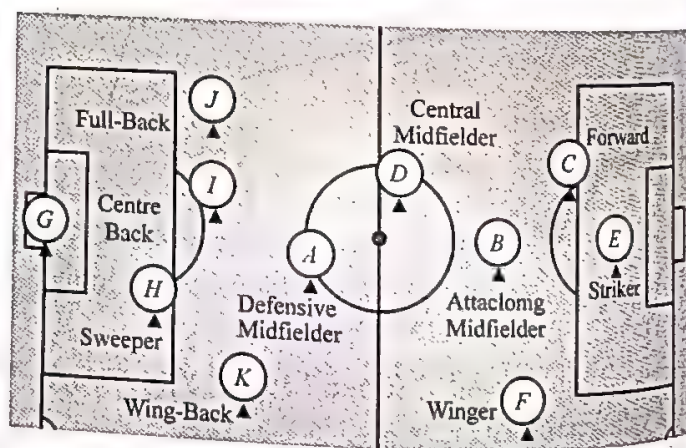
(i) Find the coordinates of hole B .

(ii) Find the shortest distance covered by the ball. Show your steps.

16. Preeti and Arun are both driving to their respective offices from the same home. Preeti drives towards the east at an average speed of 30 km per hour for 12 minutes and then towards the south at an average speed of 60 km per hour for 3 minutes. Arun drives towards the west at an average speed of 30 km per hour for 4 minutes and then towards the north at an average speed of 45 km per hour for 4 minutes.

What is the straight-line distance between Preeti's office and Arun's office? Show your steps and represent the given scenario on the coordinate plane. (CBSE CFPQ, 2023)

17. Tharunya was thrilled to know that the football tournament is fixed with a monthly timeframe from 20th July to 20th August 2023 and for the first time in the FIFA Women's World Cup's history, two nations host in 10 venues. Her father felt that the game can be better understood if the position of players is represented as points on a coordinate plane.



(CBSE SQP, 2023)

- (i) At an instance, the midfielders and forward formed a parallelogram. Find the position of the central midfielder (D) if the position of other players who formed the parallelogram are :- $A(1, 2)$, $B(4, 3)$ and $C(6, 6)$
(ii) Check if the Goal keeper $G(-3, 5)$, Sweeper $H(3, 1)$ and Wing-back $K(0, 3)$ fall on a same straight line.

OR

Check if the Full-back $J(5, -3)$ and centre-back $I(-4, 6)$ are equidistant from forward $C(0, 1)$ and if C is the mid-point of IJ .

- (iii) If Defensive midfielder $A(1, 4)$, Attacking midfielder $B(2, -3)$ and Striker $E(a, b)$ lie on the same straight line and B is equidistant from A and E , find the position of E .

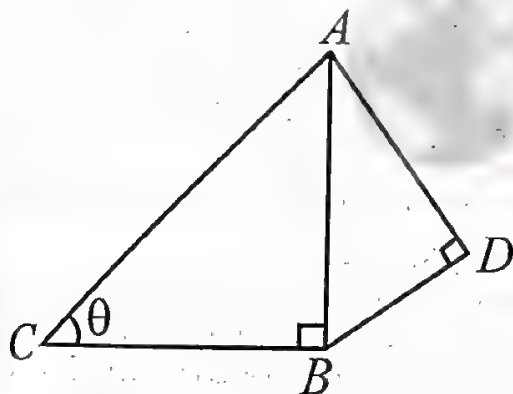
8. Trigonometry

1. If $5\tan\theta - 4 = 0$, then the value of $\frac{5\sin\theta - 4\cos\theta}{5\sin\theta + 4\cos\theta}$ is

- (a) $\frac{5}{3}$ (b) $\frac{5}{6}$
(c) 0 (d) $\frac{1}{6}$

2. In given fig., If $AD = 4$ cm, $BD = 3$ cm and $CB = 12$ cm, then $\cot\theta =$

- (A) $\frac{12}{5}$ (B) $\frac{5}{12}$
(C) $\frac{13}{12}$ (D) $\frac{12}{13}$



3. Given that $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ is

- (a) 0° (b) 30°
(c) 60° (d) 90°

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

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Most Probable Questions

4. Assertion (A): The value of $2\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ is 2.

Reason (R): Value of $\tan 45^\circ = 1$, $\cos 30^\circ = \frac{\sqrt{3}}{2}$ and $\sin 60^\circ = \frac{\sqrt{3}}{2}$.

5. Assertion (A): If $\cos A + \cos^2 A = 1$ then $\sin^2 A + \sin^4 A = 2$.

Reason (R): $1 - \sin^2 A = \cos^2 A$, for any value of A .

6. Prove that: $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$
7. If $x = p\sec\theta + q\tan\theta$ & $y = p\tan\theta + q\sec\theta$ then prove that $x^2 - y^2 = p^2 - q^2$.

8. If $7\sin^2\theta + 3\cos^2 2\theta = 4$ then show that $\tan\theta = \frac{1}{\sqrt{3}}$.

9. Prove that: $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$

10. Prove that: $\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$

11. Prove: $1 + \frac{\cot^2 \alpha}{1 + \operatorname{cosec} \alpha} = \operatorname{cosec} \alpha$

12. Prove that:

$$2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$$

13. If and then show that $n(m^2 - 1) = 2m$.

14. If $\tan\theta + \sin\theta = m$, $\tan\theta - \sin\theta = n$, then prove that $m^2 - n^2 = 4\sqrt{mn}$.

15. If $\operatorname{cosec}\theta + \cot\theta = p$, then prove that $\cos\theta = \frac{p^2 - 1}{p^2 + 1}$.

16. If $1 + \sin^2\theta = 3\sin\theta\cos\theta$,

prove that $\tan\theta = 1$ or $\frac{1}{2}$.

Competency Based Questions

17. During a math lesson, Mr. Kumar wrote the expression given below on the board and asked the students to simplify it.

$$\frac{\cos A}{1 - \sin A} + \frac{1 - \sin A}{\cos A}$$

Salma solved it in her notebook as follows:

$$\frac{\cos A}{1 - \sin A} + \frac{1 - \sin A}{\cos A}$$

$$= \frac{\cos^2 A + (1 - \sin A)^2}{(1 - \sin A) \times \cos A}$$

...(step 1)

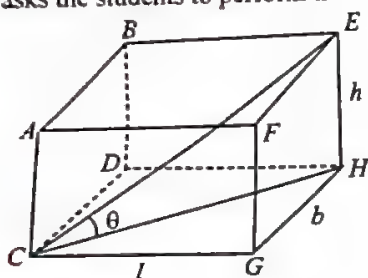
$$= \frac{\cos^2 A + \cos^2 A}{(1 - \sin A) \times \cos A} \quad \dots(\text{step 2})$$

$$= \frac{2\cos^2 A}{(1 - \sin A) \times \cos A} \quad \dots(\text{step 3})$$

$$= \frac{2\cos A}{1 - \sin A} \quad \dots(\text{step 4})$$

Examine if Salma has made any error(s) and rectify them to find the correct answer.

18. During a geometry class, the students are given a 3D model of a cuboid. The cuboid represents a box with a length of l units, a breadth of b units, and a height of h units. The teacher asks the students to perform the following tasks:



- (i) Express $\cos\theta$ in terms of l, b , and h , where θ is the angle between the diagonal CD and the length l .
- (ii) If the figure was a cube, determine the value of $\cos\theta$.
19. A coach is training athletes and incorporating trigonometry into their practice routines. If the position of three players are at A, B , and C respectively, they form an isosceles right-angle triangle at A .



Given that $AB = 6\sqrt{2}$ m, $AC = 6\sqrt{2}$ m, and $BC = 12$ m. Based on the given information, answer the following questions:

- (i) If D is the midpoint of BC , then find the value of AD .
- (ii) Find the measure of $\angle B$ and $\angle C$ (using trigonometric ratios).
- (iii) Find the value of $\sin B + \cos C$ and $(\tan^2 C + \tan^2 B)$

OR

Determine the perimeter and area of $\triangle ABC$.

9. Some Applications of Trigonometry

- The length of the shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is:
 - 45°
 - 30°
 - 60°
 - 90°
- The shadow of a vertical tower on level ground increases by 10 m when the altitude of the sun changes from 45° to 30° . Find the height of the tower. [Use $\sqrt{3} = 1.73$]
- The upper part of a tree broken over by the wind makes an angle of 30° with the ground and the distance of the foot of the tree from the point where the top touches the ground is 25 m. What was the total height of the tree?
- A vertical flagstaff stands on a horizontal plane. From a point 100 m from its foot, the angle of elevation of its top is found to be 45° . Find the height of the flagstaff.
- An aeroplane, when 3000 m high, passes vertically above another plane at an instant when the angle of elevation of two aeroplanes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the two planes. [Use $\sqrt{3} = 1.732$]
- From the top of a 7 m high building, the angle of elevation of the top of the tower is 60° and the angle of depression of the foot of the tower is 45° . Find the height of the tower.
- A bird is sitting on the top of a tree, which is 80 m high. The angle of elevation of the bird, from a point on the ground is 45° . The bird flies away from the point of observation horizontally and remains at a constant height. After 2 seconds, the angle of elevation of the bird from the point of observation becomes 30° . Find the speed of flying of the bird. [Use $\sqrt{3} = 1.732$]
- The angles of elevation of the top of a tower from two points on the ground at distances 9 m and 4 m from the base of the tower are in the same straight line with it are complementary. Find the height of the tower.
- Two pillars of equal heights stand on either side of a roadway 150 m wide. From a point on the roadway between the pillars, the angles of elevation of the top of the pillars are 60° and 30° . Find the height of pillars and the position of the point.
- A moving boat is observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat in m/h.
- A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height h . At a point on the plane, the angles of elevation of the bottom and the top of the flag staff are α and β , respectively. Prove that the height of the tower is $\left(\frac{h \tan \alpha}{\tan \beta - \tan \alpha} \right)$.

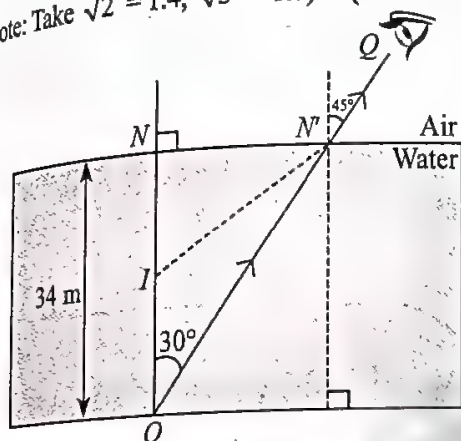
12. The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At certain instant the angles of elevation of a balloon from these windows are observed to be 60° and 30° , respectively. Find the height of the balloon above the ground.

Competency Based Questions

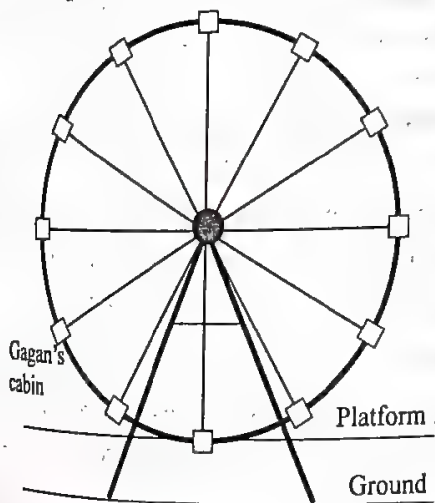
13. Shown below is a rectangular tub of water of depth 34 cm. An object O is at the bottom of the tub. The image of the object is formed at I for an observer at Q . (Note: The figure is not to scale.)

Find the distance by which the object seems to be moved for the observer. Show your work and give valid reasons.

(Note: Take $\sqrt{2} = 1.4$, $\sqrt{3} = 1.7$) (CBSE CFPQ, 2023)



14. In the giant wheel shown below, Gagan is sitting in one of the cabins which is 12 m high from the platform. Jyoti and Kiran are sitting in the lowest and the highest cabins from the platform respectively.



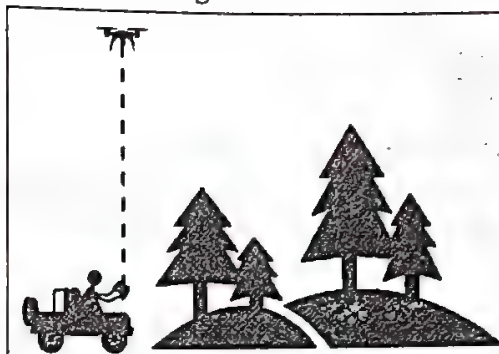
(Note: The figure is not to scale.)

From Gagan, the angle of depression of Jyoti and the angle of elevation of Kiran is 30° and 60° respectively.

- What will be the angle of elevation of Gagan from Jyoti?
- What will be the angle of depression of Gagan from Kiran?
- Find the diameter of the giant wheel. Show your steps with a diagram.

15. A drone, is an aircraft without any human pilot and is controlled by a remotecontrol device. Its various applications include policing, surveillance, photography, precision agriculture, forest fire monitoring, river monitoring and so on.

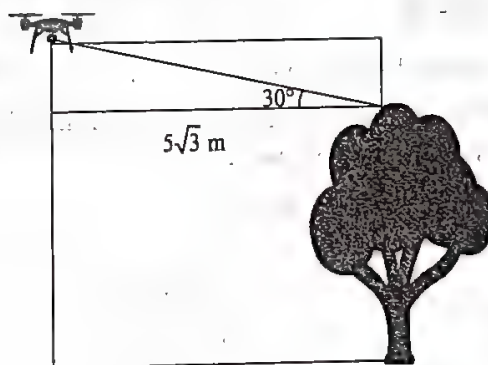
David used an advanced drone with high resolution camera during an expedition in a forest region which could fly upto 100 m height above the ground level. David rode on an open jeep to go deeper into the forest. The initial position of drone with respect to the open jeep on which David was riding is shown below.



David's jeep started moving to enter the forest at an average speed of 10 m/s. He simultaneously started flying the drone in the same direction as that of the jeep.

Based on the given information, answer the following question: [CBSE APQ, 2023]

- David reached near one of the tallest trees in the forest. He stopped the drone at a horizontal distance of $5\sqrt{3}$ m from the top of the tree and at a vertical distance of 65 m below its maximum vertical range.

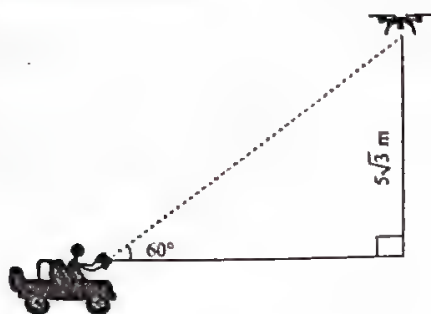


(Note: The figure is not to scale.)

If the angle of elevation of the drone from the top of the tree was 30° , find the height of the tree. Show your work.

- The drone was flying at a height of $30\sqrt{3}$ metres at a constant speed in the horizontal direction when it spotted a zebra near a pond, right below the drone. The drone travelled for 30 metres from there and it could see the zebra, at the same place, at an angle of depression of θ from it. Draw a diagram to represent this situation and find θ . Show your work.

- (iii) After 2 minutes of starting the expedition both the drone and the jeep stopped at the same moment so that the drone can capture some images. The position of the drone and the jeep when they stopped is as shown below.

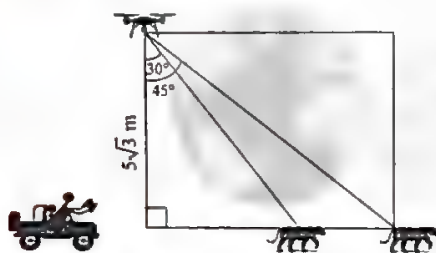


(Note: The figure is not to scale.)

Find the average speed of the drone in m/s rounded off upto 2 decimal places. Show your work.

OR

At some point during the expedition, David kept the drone stationary for some time to capture the images of a tiger. The angle of depression from the drone to the tiger changed from 30° to 45° in 3 seconds as shown below.



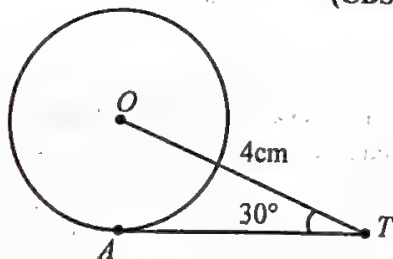
(Note: The figure is not to scale.)

What was the average speed of the tiger during that time? Show your work.

(Note: Take $\sqrt{3}$ as 1.73.)

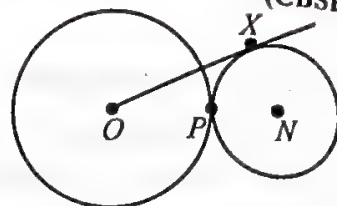
10. Circles

1. In given figure, AT is a tangent to the circle with centre O such that $OT = 4$ cm and $\angle OTA = 30^\circ$. Then AT is equal to (CBSE APQ, 2023)



- (a) 4 cm (b) 2 cm
(c) $2\sqrt{3}$ cm (d) $4\sqrt{3}$ cm

2. Two circles with centres O and N touch each other at point P as shown. O , P and N are collinear. The radius of the circle with centre O is twice that of the circle with centre N . OX is a tangent to the circle with centre N , and $OX = 18$ cm. (CBSE APQ, 2023)

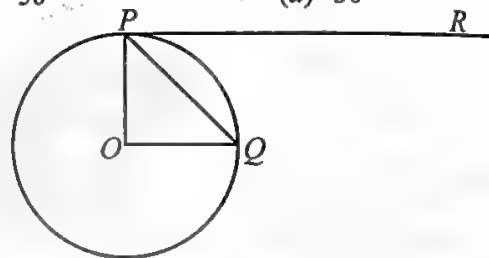


What is the radius of the circle with centre N ?

- (a) $\frac{18}{\sqrt{2}}$ (b) 9 cm
(c) $\frac{9}{\sqrt{2}}$ (d) $\frac{18}{\sqrt{10}}$

3. If O is centre of a circle and Chord PQ makes an angle 50° with the tangent PR at the point of contact P , then the angle subtended by the chord at the centre is (CBSE SQP, 2023)

- (a) 130° (b) 100°
(c) 50° (d) 30°



Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

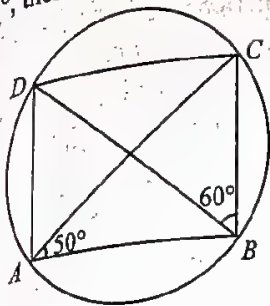
4. Assertion (A): The length of the tangent drawn from a point 8 cm away from the centre of circle of radius 6 cm is $2\sqrt{7}$ cm.

Reason (R): If the angle between two radii of a circle is 130° , then the angle between the tangents at the end points of radii at their point of intersection is 50° .

5. Assertion (A): PQ is a tangent to a circle with centre O at point P . If $\triangle OPQ$ is an isosceles triangle, then $\angle PQO = 45^\circ$.

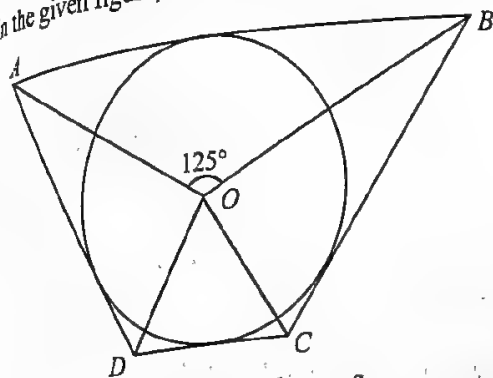
Reason (R): If two tangents inclined at 60° are drawn to a circle of radius 3 cm, then the length of each tangent is $3\sqrt{3}$ cm.

6. In fig., $ABCD$ is a cyclic quadrilateral. If $\angle BAC = 50^\circ$ and $\angle DBC = 60^\circ$, then find $\angle BCD$.

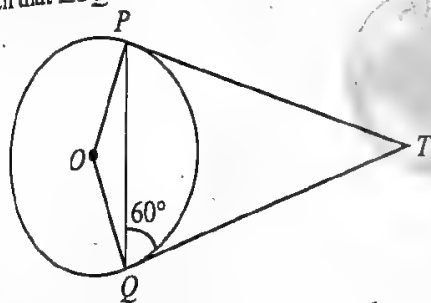


7. If radii of two concentric circles are 4 cm and 5 cm, then find the length of the chord of that circle which is tangent to the other circle.

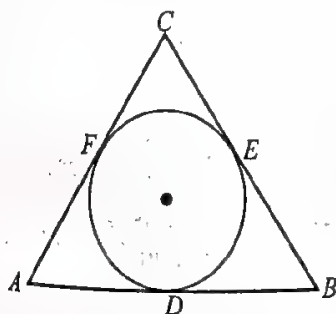
8. In the given figure, If $\angle AOB = 125^\circ$ then find $\angle COD$.



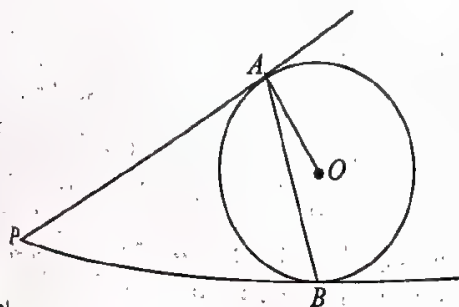
9. If two tangent TP and TQ are drawn from an external point T such that $\angle TQP = 60^\circ$ then find $\angle OPQ$.



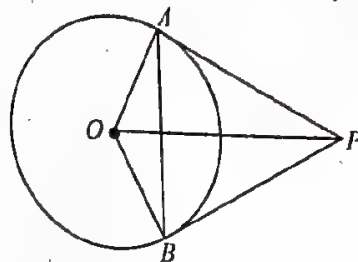
10. In the given figure find AD , BE , CF where $AB = 12$ cm, $BC = 8$ cm and $AC = 10$ cm.



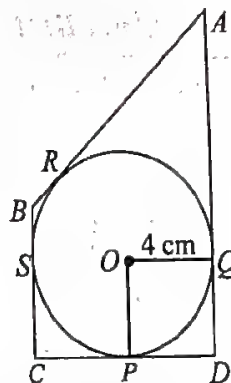
11. Two tangents PA and PB are drawn to a circle with centre O from an external point P . Prove that $\angle APB = 2\angle OAB$.



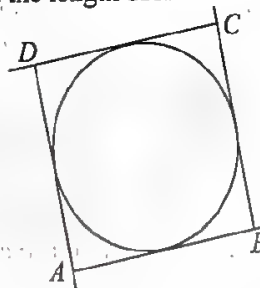
12. In the given fig. OP is equal to the diameter of the circle with centre O . Prove that $\triangle ABP$ is an equilateral triangle.



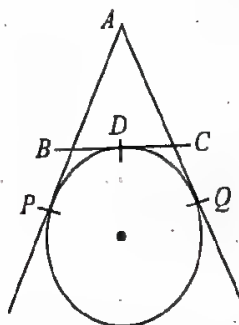
13. In the given fig., find PC . If $AB = 13$ cm, $BC = 7$ cm and $AD = 15$ cm.



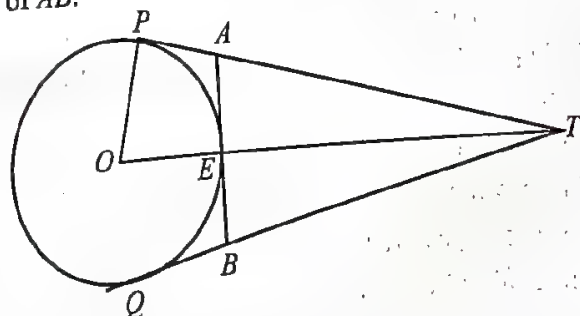
14. In the given figure, a circle touches all the four sides of a quadrilateral $ABCD$. If $AB = 6$ cm, $BC = 9$ cm and $CD = 8$ cm, then find the length of AD .



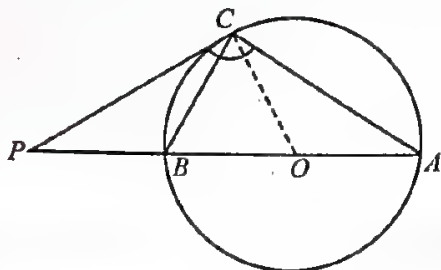
15. In the given figure, find the perimeter of $\triangle ABC$, if $AP = 12$ cm.



16. In given Fig. O is the centre of a circle of radius 5 cm, T is a point such that $OT = 13$ cm and OT intersects the circle at E . If AB is the tangent to the circle at E , find the length of AB .

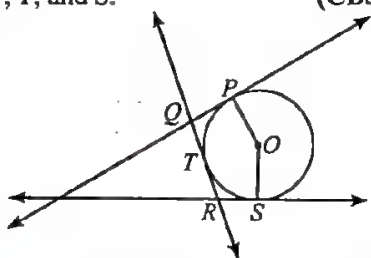


17. The tangent at a point C of a circle and a diameter AB when extended intersect at P . If $\angle PCA = 110^\circ$, find $\angle CBA$ [see given Fig.]



Competency Based Questions

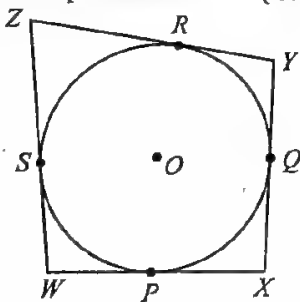
18. Shown below is a circle with centre O having tangents at points P, T , and S . (CBSE APQ, 2023)



(Note: The figure is not to scale.)

If $QR = 12$ cm and the radius of the circle is 7 cm, what is the perimeter of the polygon $PQTRS$?

- (a) 26 cm
(b) 31 cm
(c) 38 cm
(d) cannot say with the given information.
19. Raghav drew the following figure on a board where a circle is inscribed in a quadrilateral. (CBSE CF PQ, 2023)



(Note: The figure is not to scale.)

Then he wrote the following relationships.

- (i) $ZW + WX = XY + YZ$
(ii) $ZY + WX = ZW + YX$

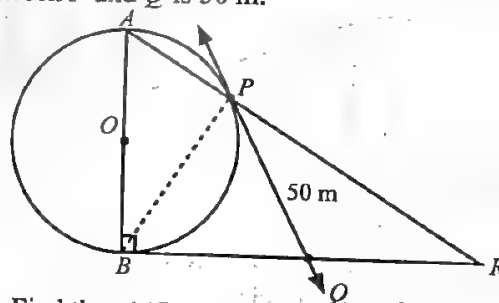
Which of the above relationships is/are DEFINITELY true?

- (a) only (i)
(b) only (ii)
(c) both (i) and (ii)
(d) neither (i) nor (ii)

20. Ferris wheels are a popular attraction at fairs and amusement parks all over the world. They offer a unique and exciting experience for people of all ages. It is a large amusement ride consisting of a rotating upright wheel with passenger cars attached to the rim. The wheel is rotated by a motor and gears, and the cars rotate with the wheel. The cars are typically enclosed, and they have seats for riders.



Ravi with his four friends went to a fair and there they decided to enjoy the ride of the Ferris wheel. Due to the fear of the height, Ravi and one of his friends decided not to join them. They came out of the crowd and started observing their friends who were enjoying the ride. Ravi forms the figure as given below where the distance between P and Q is 50 m.



- (i) Find the $\angle APB$.
(ii) Find the distance between B and Q .

OR

Find the distance between Q and R .

- (iii) If the radius of the Ferris wheel is 10 m, then find the distance between A and R .

11. Areas Related to Circles

1. If the circumference of a circle and the perimeter of a square are equal, then
- (a) Area of the circle = Area of the square
(b) Area of the circle > Area of the square
(c) Area of the circle < Area of the square
(d) Nothing definite can be said about the relation between the areas of the circle and square.

2. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is

- (a) 22 : 7 (b) 14 : 11
(c) 7 : 22 (d) 11 : 14

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

3. Assertion (A): In a circle of radius 6 cm, the angle of a sector 60° . Then the area of the sector is $18\frac{6}{7} \text{ cm}^2$

Reason (R): Area of the circle with radius r is πr^2 .

4. Assertion (A): The length of the minute hand of a clock is 7 cm. Then the area swept by the minute hand in 5 minutes is $12\frac{5}{6} \text{ cm}^2$

Reason (R): The length of an arc of a sector of angle and radius r is given by $l = \frac{\theta}{360^\circ} \times 2\pi r$

5. A wire can be bent in the form of a circle of radius 35 cm. If it is bent in the form of a square, then what will be its area?

6. If diameter of a circle is increased by 40%, find by how much percentage its area increases?

7. A piece of wire 20 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle.

8. Find the area of a quadrant of a circle whose circumference is 22 cm.

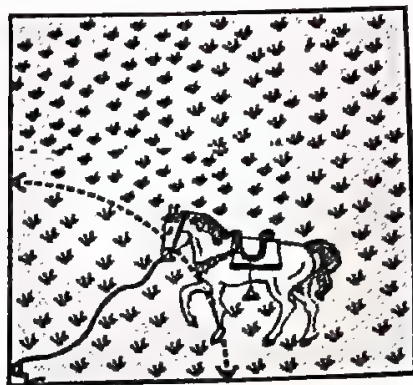
9. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

10. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:

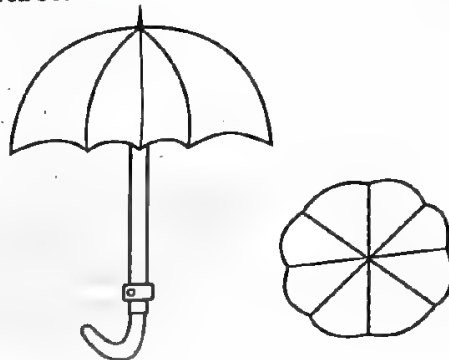
- (i) the length of the arc
(ii) area of the sector formed by the arc
(iii) area of the segment formed by the corresponding chord

11. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

12. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope (see Fig.) Find
(i) the area of that part of the field in which the horse can graze.
(ii) the increase in the grazing area if the rope were 10 m long instead of 5 m. (Use $\pi = 3.14$)



13. An umbrella has 8 ribs which are equally spaced (see Fig.) Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella.



14. Area of a sector of a circle of radius 36 cm is $54\pi \text{ cm}^2$. Find the length of the corresponding arc of the sector.

Competency Based Questions

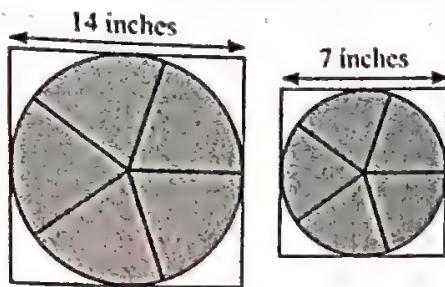
15. Avikant bought a pair of glasses with wiper blades. He was curious to know the area being cleaned by each of the wiper blades. With the help of a ruler and a protractor, he found the length of each blade as 3 cm and the angle swept as 60° .



- (i) Find the area that each wiper cleans in one swipe, in terms of π .
(ii) If the diameter of each circular glass is 5 cm, what percent of the area of the glass will be cleaned by the blade in one swipe?

Show your work.

16. Sameer and Madhur drew two circles circumscribed by squares of side 14 and 7 inches respectively. Both the circles are divided into 5 equal sectors as shown below.



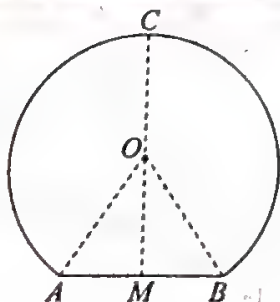
- Determine the area occupied by one sector of the larger circle.
- Sameer says, "The area occupied by 2 sectors of the larger circle is equal to the area occupied by 4 sectors of the smaller circle, as the side of the larger square is twice of the smaller square."

Do you agree with the statement? Justify your answer.

(Take: $\pi = \frac{22}{7}$ if required.)

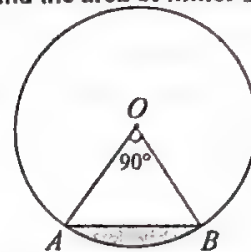
17. The South Central Zone of Indian Railways has commissioned the longest electrified railway tunnel in the country. According to local media reports, the construction of the 6.6 km-long tunnel took 43 months to complete. The electrified railway tunnel is situated between Cherlopalli and Rapuru stations as a part of the Obulavaripalli-Venkatachalam railway line. The tunnel is expected to facilitate freight movement in the region, reducing the distance between Krishnapatnam Port and hinterland areas by nearly 60 km.

The adjoining figure shows a cross-section of the railway tunnel, which is a part of a circle. The radius OA of the circular part is 4 m and $\angle AOB = 90^\circ$.

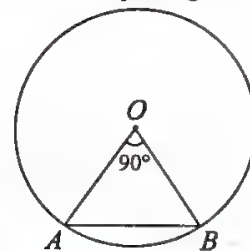


Based on the given information, answer the following question:

- Considering the tunnel to be part of a circle as shown below, find the area of minor segment.



- Find the area of major segment.



- Find the perimeter of cross-section.

12. Surface Areas and Volumes

- The total surface area of a solid hemisphere of radius r is
 - πr^2
 - $2\pi r^2$
 - $3\pi r^2$
 - $4\pi r^2$
- A cylinder, a cone and a hemisphere are of the same base and of the same height. The ratio of their volumes is
 - 1 : 2 : 3
 - 2 : 1 : 3
 - 3 : 1 : 2
 - 3 : 2 : 1

Direction: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true but Reason (R) is false.
- Assertion (A) is false but Reason (R) is true.

- Assertion (A):** If the surface area of a ball which is in the shape of a sphere is 221.76 cm^2 , then its diameter is 8.4 cm.

Reason (R): If r be the radius of the sphere, then surface

area, $S = 4\pi r^2$, i.e. $r = \frac{1}{2} \sqrt{\frac{S}{\pi}}$.

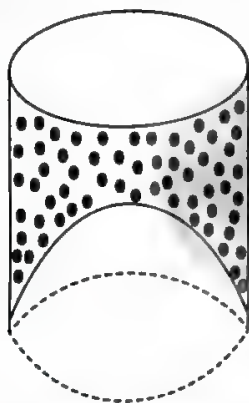
4. **Assertion (A):** If the volumes of two spheres are in the ratio 27 : 8, then their surface areas are in the ratio 3 : 2.

Reason (R): Volume of the sphere $= \frac{4}{3}\pi r^3$ and its surface area $= 4\pi r^2$

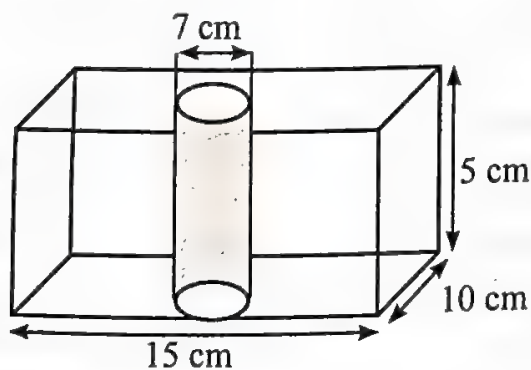
5. Volume of two spheres is in the ratio 64 : 125. Find the ratio of their surface areas.
6. Two identical cubes each of volume 216 cm^3 are joined together end to end. What is the surface area of the resulting cuboid?
7. A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid.

Use $\pi = \frac{22}{7}$

8. A juice seller was serving his customers using glasses as shown in figure. The inner diameter of the cylindrical glass was 5 cm but bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent and actual capacity of the glass. [Use $\pi = 3.14$]



9. In the given figure, from a cuboidal solid metallic block of dimensions $15 \text{ cm} \times 10 \text{ cm} \times 5 \text{ cm}$ a cylindrical hole of diameter 7 cm is drilled out. Find the surface area of the remaining block. [Use $\pi = \frac{22}{7}$].



10. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

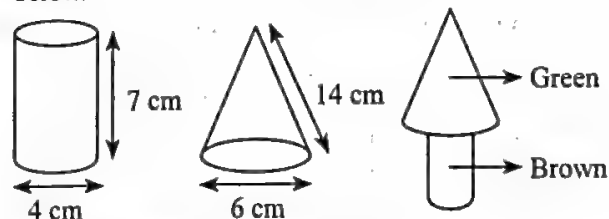
11. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Fig. 12.11. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.



12. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.
13. A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket. [use $\pi = 3.14$]

Competency Based Questions

14. Deepika takes a solid cylinder and attaches it to a solid cone to make the figure of a tree as shown in the figure below.



(Note: The figure is not to scale.)

She wants the conical part including its base to be painted green and the cylindrical part including its base to be painted brown to resemble a tree.

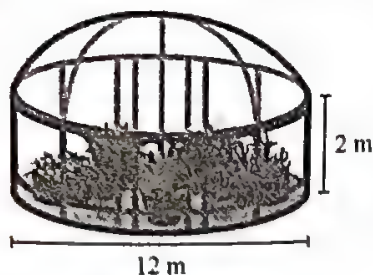
(i) Find the area to be painted green.

(ii) Find the area to be painted brown.

(Note: Round the answers to 2 decimal places.)

(Take π as $\frac{22}{7}$.)

15. Dinesh is building a greenhouse in his farm as shown below. The base of the greenhouse is circular having a diameter of 12 m and it has a hemispherical dome on top.

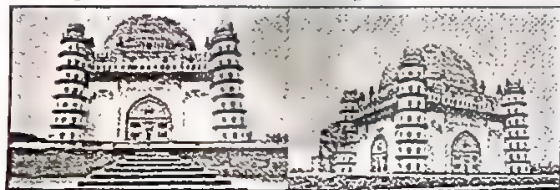


(Note: The image is not to scale.)

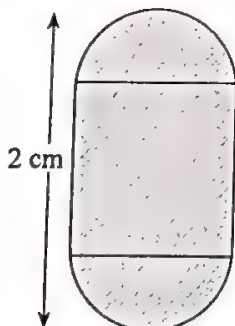
How much will it cost him to cover the walls and top of the greenhouse with transparent plastic, if the plastic sheet costs Rs 77 per sq m? Show your steps.

(Note: Take $\pi = \frac{22}{7}$.)

16. A school mathematics teacher took her class x students on an educational trip to show Gol Gumbaz. The teacher had an interest in history as well. She told children about the history of Gol Gumbaz. Gol Gumbaz is the tomb of king Muhammad Adil Shah. The construction of this tomb was started in 1626 and completed in 1656. The teacher then stated that this monument contains a combination of solid figures. She pointed that there are a cubical bases and a hemispherical dome is at the top.



- (i) If one side of the cubical portion is 23 m, then what is the diagonal of the cubic portion of the Gol Gumbaz?
- (ii) A block of Gol Gumbaz is in the shape of a cylinder of diameter 0.5 cm with two hemispheres stuck to each of its ends. The length of the shape is 2 cm. What is the volume of the block? (Use $\pi = 3.14$)



OR

Find the total surface area of Gol Gumbaz.

- (iii) What is the curved surface area of the new solid formed by joining two solid hemispheres of same radii r along their bases?

13. Statistics

1. For the following distribution

| Class | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 |
|-----------|-----|------|-------|-------|-------|
| Frequency | 10 | 15 | 12 | 20 | 9 |

The sum of Lower limits of the median class and modal class is

- (a) 15 (b) 25
(c) 30 (d) 35
2. The median and mode respectively of a frequency distribution are 26 and 29. Then, its mean is
- (a) 27.5 (b) 24.5
(c) 28.4 (d) 25.8
3. If x_i 's are the mid points of the class intervals of grouped data, f_i 's are the corresponding frequencies and \bar{x} is the mean, then $\sum (f_i x_i - \bar{x})$ is equal to
- (a) 0 (b) -1
(c) 1 (d) 2
4. Consider the following distribution:

| Marks obtained | Number of students |
|--------------------------|--------------------|
| More than or equal to 0 | 63 |
| More than or equal to 10 | 58 |
| More than or equal to 20 | 55 |
| More than or equal to 30 | 51 |
| More than or equal to 40 | 48 |
| More than or equal to 50 | 42 |

The frequency of the class 30-40 is

- (a) 3 (b) 4
(c) 48 (d) 51

Direction: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

5. **Assertion (A):** The mode of the call received on 7 consecutive day 11, 13, 13, 17, 19, 23, 25 is 13.

Reason (R): Mode is the value that appears most frequent; 2 times maximum call received day is 13

6. **Assertion (A):** If the median of the given data 26, 29, 42, 53, x , $x+2$, 70, 75, 82, 93 is 65 then the value of x is 64.

Reason (R): When the number of observations (n) is odd then the median is the value of the $\left(\frac{n+1}{2}\right)^{\text{th}}$ observation.

7. The mean of 20 numbers is 18. If 2 is added to each number, what is the new mean?
8. The mean of 5 observations 3, 5, 7, x and 11 is 7, find the value of x .
9. The mean of 11 observations is 50. If the mean of first six observations is 49 and that of last six observations is 52, then find sixth observation.
10. Find the median of the following data:

| Marks | No. of student |
|----------|----------------|
| Below 10 | 0 |
| Below 20 | 12 |
| Below 30 | 20 |
| Below 40 | 28 |
| Below 50 | 33 |
| Below 60 | 40 |

11. The mean of the following data is 53, Find the values of f_1 and f_2 .

| C.I. | f |
|--------|-------|
| 0-20 | 15 |
| 20-40 | f_1 |
| 40-60 | 21 |
| 60-80 | f_2 |
| 80-100 | 17 |
| Total | 100 |

12. If the median of the distribution given below is 28.5, find the values of x and y .

| C.I. | f |
|-------|-----|
| 0-10 | 5 |
| 10-20 | 8 |
| 20-30 | x |
| 30-40 | 15 |
| 40-50 | y |
| 50-60 | 5 |
| Total | 60 |

13. The mode of the frequency distribution is 36. Find the missing frequency (f).

| Class | Frequency |
|-------|-----------|
| 0-10 | 8 |
| 10-20 | 10 |
| 20-30 | f |
| 30-40 | 16 |
| 40-50 | 12 |
| 50-60 | 6 |
| 60-70 | 7 |

14. Find the unknown entries a, b, c, d, e, f in the following distribution of heights of students in a class:

| Height (in cm) | Frequency | Cumulative frequency |
|----------------|-----------|----------------------|
| 150-155 | 12 | a |
| 155-160 | b | 25 |
| 160-165 | 10 | c |
| 165-170 | d | 43 |
| 170-175 | e | 48 |
| 175-180 | 2 | f |
| Total | 50 | |

Competency Based Questions

15. A traffic police officer collects the following data for the number of cars crossing different Traffic Lights (TL) of his city in a minute.

| Traffic Light | Number of cars crossing |
|---------------|-------------------------|
| TL1 | 15 |
| TL2 | 9 |
| TL3 | 16 |
| TL4 | 16 |
| TL5 | 14 |

The police officer makes an error while writing the data for TL3 and gets the average number of cars crossing traffic lights in a minute as 3 cars more than the actual average number of cars crossing traffic lights.

- (i) What is the actual number of cars crossing TL3 in that minute?
- (ii) Which Traffic Light was the busiest in that minute? Show your work.
16. A car assembly unit assembles a limited number of cars daily, depending on the prevailing demand. The following table presents an analysis of the number of cars assembled by the unit over three consecutive months:

| Cars assembled per day | Number of days |
|------------------------|----------------|
| 0-4 | 33 |
| 4-8 | 18 |
| 8-12 | 21 |
| 12-16 | 11 |
| 16-20 | 7 |

- (i) If the demand of the cars is doubled, estimate how many cars on an average should be assembled per day such that the increased demand is met?
- (ii) At least on how many days, less than average number of cars were assembled?

Show your work.

17. In Delhi, The Nation Highway Authority of India (NHAI) checking in particular toll plaza for toll tax collection.



The following table shows the toll tax paid by drivers and the number of vehicles on that particular day.

| Toll tax (in ₹) | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|--------------------|-------|-------|-------|-------|-------|
| Number of vehicles | 80 | 110 | 120 | 70 | 40 |

Based on the above information, answer the following questions.

- If A is taken as assumed mean, then find the possible value of A .
- Find the mean of toll tax received by NHAI by assumed mean method.

OR

Find the average toll tax received by NHAI in a day, from that particular toll plaza,

- If x_i 's denotes the class marks and d_i 's 's denotes the deviation of assumed mean (A) from x_i 's, then find the minimum value of $|d_i|$.

14. Probability

- Which of the following cannot be the probability of an event?
 - 0.7
 - $\frac{2}{3}$
 - 1.5
 - 15%
- An event is very unlikely to happen, its probability is closest to
 - 0.0001
 - 0.001
 - 0.01
 - 0.1
- Rashmi has a die whose six faces show the letters as given below:



If she throws the die once, then the probability of getting C is:

- $\frac{1}{3}$
- $\frac{1}{4}$
- $\frac{1}{5}$
- $\frac{1}{6}$

- The probability that a non-leap year selected at random will contains 53 Mondays is:
 - $\frac{1}{7}$
 - $\frac{2}{7}$
 - $\frac{3}{7}$
 - $\frac{5}{7}$

Direction: In the following questions, A. statement Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true but Reason (R) is false.
- Assertion (A) is false but Reason (R) is true.

- Assertion (A):** The probability of getting a bad egg in a lot of 400 is 0.035. The number of good eggs in the lot is 386.

Reason (R): If the probability of an event is p , the probability of its complementary event will be $1-p$

(CBSE DL, 2023)

- Assertion (A):** The probability that a leap year has 53 Sundays is $\frac{2}{7}$.

Reason (R): The probability that a non-leap year has 53

Sundays is $\frac{5}{7}$. (CBSE DL, 2023)

- Two dice are rolled simultaneously. Find the probability that the sum of the two numbers appearing on the top is more than and equal to 10.
- Cards marked with number 3, 4, 5, ..., 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number.
- If a number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3. What is probability that $x^2 \leq 4$?
- A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that the product of x and y is less than 16.
- A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two digit number (ii) a perfect square number (iii) a number divisible by 5.
- A die is thrown twice. Find the probability that:
 - 5 will come up at least once
 - 5 will not come up either time

13. A die has its six faces marked 0, 1, 1, 1, 6, 6. Two such dice are thrown together and the total score is recorded.
- How many different scores are possible?
 - What is the probability of getting a total of 7?
14. A bag contains 24 balls of which x are red, $2x$ are white and $3x$ are blue. A ball is selected at random. What is the probability that it is (i) not red? (ii) white?

Competency Based Questions

15. On a particular day, Vidhi and Unnati couldn't decide on who would get to drive the car. They had one coin each and flipped their coins exactly three times. The following was agreed upon:

- If Vidhi gets two heads in a row, she would drive the car.
- If Unnati gets a head immediately followed by a tail, she would drive the car.

Who has more probability to drive the car that day? List all outcomes and show your steps. (CBSE CFPQ, 2023)

16. At a party, there is one last pizza slice and two people who want it. To decide who gets the last slice, two fair six-sided dice are rolled. If the largest number in the roll is 1, 3, or 6, Ananya gets the last slice, and if it is 2, 4, or 5, Pranit gets it.

In a random roll of dice, who has a higher chance of getting the last pizza slice?

17. Sahiba conducted a survey in her school for 150 students of Class 10. She asked the students two multiple choice questions, which were "What time do you go to sleep at night?" and "What is your favourite subject?". Each student could choose only one option from the choices given.

Sahiba tabulated the results from her survey as shown below.



| Sleep Schedule | | | | |
|----------------|---------|-------------|---------|----------------|
| Time | English | Mathematics | Science | Social Science |
| Before 9 PM | 5 | 7 | 8 | 7 |
| 9 PM-10 PM | 10 | 12 | 11 | 9 |
| 10 PM-11 PM | 10 | 12 | 13 | 13 |
| After 11 PM | 7 | 8 | 10 | 8 |

Based on the given information, answer the following questions:

- If a student is randomly selected, what is the probability that they sleep after 11 PM and that their favourite subject is NOT Social Science?
- If a student is randomly selected, what is the probability that they go to sleep after 10 PM?
- If a student is randomly selected, what is the probability that they go to sleep between 9 PM and 10 PM and that their favourite subject is Mathematics?

OR

If a student is randomly selected, what is the probability that they go to sleep before 10 PM and that their favourite subject is either Science or Social Science?

SOCIAL SCIENCE

CHAPTER-1

THE RISE OF NATIONALISM IN EUROPE

HISTORY

Cheat Sheet

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- Emergence of Constitution of France
- Estates General renamed as the National Assembly
- Centralised Administration
- Uniform system of weights and measures
- French language made a common language

- La patrie
- Le citoyen
- Tricolour French flag
- Equal Rights

Romanticists criticised science and focussed instead on emotions, intuition and mystical feelings. Language and folklores were used to instil national spirit.

French Revolution-1789

Administrative Changes

Napoleonic Code

- Introduction of civil code (1804)
- Equality of all before law
- Privileges of high class abolished
- Feudal system ended
- Peasants freed from serfdom system
- Transport and communication improved

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Aristocracy and New Middle Class

- Aristocrats: numerically small dominant social and political class united by common way of life. Emergence of commercial classes-existence band on production for market.
- New middle class: working class, artisans, businessmen, professionals etc.

Liberal Nationalism

- Political: End of clerical privilege, autocracy, representative form of government through parliament, inviolability of private property, limited suffrage.
- Economic: Freedom of markets, abolition of state-imposed restrictions on movement of goods of capital.

CBSE-2023, 2022 Term-I, 2020

The Rise of Nationalism in Europe

The French Revolution and the idea of Nation

In 1830s, increased population, food shortages and widespread unemployment brought people out on the roads.

The Making of Nationalism in Europe

CBSE-2023, 2022 Term-I

Revolutionaries

- Secret societies sprang up in many parts of Europe to oppose monarchical forms and to fight for liberty and freedom.
- Giuseppe Mazzini, an Italian revolutionary founded 2 secret societies, Young Italy in Marseilles and Young Europe in Bern.

Romantic Imagination & National Feeling

The age of Revolutions: 1830-1848

CBSE-2022 Term-I

Hunger, Hardship & Popular Revolt

Liberal Revolt

- Uproar in France in July 1830
- Uprising in Brussels
- Uprising in Greece 1821
- Treaty of Constantinople 1832

CBSE-2022 Term-I

New Conservatism after 1815

- Conservatism: when they realised that modernisation could strengthen traditional institutions like the Monarchy introduced a modern army, an efficient bureaucracy, a dynamic economy, abolition of serfdom and feudalism. Treaty of Vienna (1815)

CBSE-2022 Term-I

CBSE 2024, 2022 Term-1

- ❑ Attempt to set up a constitutional monarchy at Frankfurt in 1848 was suppressed by the monarchy, Military and Junkers.
- ❑ Prussian Chief Minister Otto Von Bismarck takes the lead in German unification.
- ❑ He planned the unification with the help of the Prussian Army and Bureaucracy.
- ❑ Ensured unification after 3 wars with France, Austria and Denmark over 7 years.
- ❑ Process completed with the crowning of Kaiser William I as King of Germany.

Unification of Germany

Strange Case of Britain

English, Welsh, Scot or Irish (ethnicity) was the primary identities of inhabitants of Britain Isles. United Kingdom of Great Britain was formed as a result of the Act of Union (1707).

The Rise of Nationalism in Europe

The Making of Germany and Italy

Unification of Italy

Visualising the Nation

Allegory of the Nation

Nationalism and Imperialism

Nationalism in the Balkans State

CBSE 2024, 2023, 2022 Term-1

- ❑ Idea of unification was first given by Giuseppe Mazzini through his secret society called young Italy.
- ❑ The lead was taken by the king of Sardinia, Victor Emmanuel II.
- ❑ Count Cavour, Chief Minister of Sardinia, led the unification process by alliance with France to defeat Austria and unify its Northern territories.
- ❑ Giuseppe Garibaldi led a movement in Western part by involving local peasant support to attack Spanish rule.
- ❑ Process completed with the crowning of Victor Emmanuel II as king of Italy in 1861.

Female figure (allegory) chosen to personify the nation, to give the abstract idea of nation a concrete form. 'Germania' in Germany and 'Christened Marianne' in Italy was chosen.

- ❑ Tensions of Europe after 1971 was the area called the Balkans.
- ❑ First world war (1914-1918)
- ❑ In 1914, Europe was disastrous because of Nationalism, aligned with imperialism.
- ❑ Anti-imperial movements were developed but they all struggled to form independent nation-states.

CHAPTER-2 NATIONALISM IN INDIA

Cheat Sheet

- CBSE 2022 Term-II**
- Satyagraha is Mahatma Gandhi's concept of peaceful protest (fighting with peace).
 - Champaran Satyagraha 1916.
 - Mill worker's movement in Ahmedabad 1918.
 - Kheda Satyagraha 1918.

Satyagraha

CBSE 2023
The way of Changes Nationalism

Rowlatt Act

Non-Cooperation Movement

Rise of Nationalism after First World War

Reason

- CBSE 2022 Term-II**
- Increase in custom duties and introduction of income tax due to war loans.
 - Extreme hardships due to increase in price of essential goods.
 - Forced recruitment in the army.
 - Shortage of food due to crop failure, famines and epidemics.

CBSE 2020
The First World war, Khilafat & Non-Cooperation

- Rowlatt Act (1919) was passed in a hurry by the Imperial Legislative Assembly despite the opposition from the Indian members of the council.
- Local leaders were arrested in Amritsar and Gandhiji was barred from entering Delhi, martial law was imposed in Amritsar
- A number of people gathered in Jallianwala Bagh to celebrate Baisakhi unaware of the martial law.
- celebrate Baisakhi unaware of the martial law. General Dyer ordered open fire on them killing hundreds of people.
- People in India opposed the killings by attacking government offices, police stations etc.

- CBSE 2022 Term-I & 2020**
- Surrender of Govt. Titles.
 - Boycott of civil services, army, police, courts and legislative councils. Schools and foreign goods.

Nationalism in India

CBSE 2020
Differing strands within Movement

The Movement in the Towns

- Students left government schools, officers resigned, lawyers gave up their practices, and traders and merchants boycotted foreign goods.
- The movement experienced a slowdown due to the high price of Khadi cloth and the absence of adequate alternative Indian institutions to replace British-established systems.

Movement in the Countryside

- In Awadh Peasants were led by Ram Chandra - a Santyasi, who had earlier been to Fiji as an indentured labourer.
- Peasants had to do begar and work at the landlord's farms without any payment. Peasants movement demanded abolition of begar and reduction of revenues.
- The movement in the countryside was against talukdars and landlords who demanded high rents and other cesses.

Swraj in the Plantations

- CBSE 2023 & 2020**
- Under the Inland Emigration Act of 1859, workers were not allowed to leave the plantations without permission, which was seldom granted.
 - Workers defied the authorities, left the plantations.

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- Mahatma Gandhi relaunched the Civil Disobedience Movement.
- For over a year, the movement continued, but by 1934 it lost its momentum.

Re-launch of the Movement

Salt March

Aspects of the Movement

CBSE 2022 Term-II

- The Salt Satyagraha was a large-scale civil disobedience movement started by Mahatma Gandhi in response to the imposition of a salt tax in India by the British administration.
- Mahatma Gandhi initiated the Salt March from Sabarnati to Dandi with 78 followers, embarking on a profound act of civil disobedience.
- Arriving at Dandi on April 6, 1930, Gandhi defied British law by producing salt from sea water, symbolically challenging British authority.

- The Simon Commission was established by Britain's Tory government
- Sir John Simon, to review nationalist demands and recommend changes to India's constitutional framework.
- The commission was met with widespread protest and the slogan "Go back Simon" in India due to its all-English membership.
- The Simon Commission proposed 'dominion status' as a topic for future discussions on India's Constitution.

- Gandhi ended the movement due to escalating violence.
- There was significant debate within the Congress about participating in council elections.
- **Formation of Swaraj Party**
- C. R. Das and Motilal Nehru established the Swaraj Party within the Congress to advocate for council entry.
- Jawaharlal Nehru and Subhash Chandra Bose pressed for mass agitation and for full independence.

Gandhi-Irwin Pact

Nationalism in India

Towards Civil Disobedience

CBSE 2024

Simon Commission

Effect of Civil Disobedience Movement

Withdrawal of Non-Cooperation Movement

- The movement spread to the entire nation.
- Colonial laws were violated, salt manufactured in numerous places.
- Foreign clothes were burnt and picketing liquor shops.
- Peasants refused to pay revenue and chauthdari tax.

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Different Perspective of The Movement

Business Class

Poor Peasants

Industrial Worker

Rich Peasants

- The pact was signed on March 5, 1931, wherein Mahatma Gandhi agreed to attend the Round Table Conference.
- The British government consented to release political prisoners as part of the pact's conditions.
- Held in London in 1931, this conference concluded without achieving any substantive results.

- They wanted protection against imports of foreign goods.
- The Indian Industrial and Commercial Congress was established in 1920 and FICCI in 1927 by leading Indian industrialists.
- These groups opposed colonial economic policies and supported the initial launch of the Civil Disobedience Movement.

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- The poor peasants were interested in the reduction of the revenue demand.
- Congress was unwilling to support 'no rent' campaigns in most of the places.

- The wealthy Patidars of Gujarat and the Jats of Uttar Pradesh were involved in the 'movement in the countryside.
- For them the fight for Swaraj was struggle against high revenues.

CBSE 2024

- The Industrial Working Classes did not participate in the Civil disobedience Movement in large numbers except in the Nagpur region.
- There were strikes by railway workers in 1930 and dock workers in 1932.

- They participated in protest marches, manufactured salt and picketed foreign cloth and liquor shops.
- In Urban areas these women were from high-caste families; in rural areas they came from rich peasant households.

- ❑ People began to see themselves as members of a unified nation, recognizing a common bond among diverse communities.
- ❑ To foster nationalism, communities developed folklore, and created national figures, symbols, and icons that encapsulated shared values and aspirations.

Nationalism in India

Towards Civil Disobedience

Feeling of Collective Belonging

Positive and Negative aspects of Nationalism

- ❑ The Indian national struggle united various groups and classes in a collective effort for independence.
- ❑ Conflicts among different groups occasionally emerged, sometimes leading to the movement's failure.

Quit India Movement

- ❑ Launched in 1942 after the failure of the Cripps Mission.
- ❑ Led by Mahatma Gandhi with the slogan "Do or Die."
- ❑ Involved diverse sections of society including students, workers, and women.
- ❑ Marked by severe crackdowns, mass arrests, and violence.
- ❑ Weakened British control and paved the way for India's independence in 1947.

CHAPTER-3 THE MAKING OF A GLOBAL WORLD

Cheat Sheet

- CBSE 2023**
- In 16th century, Europe sailors found a sea route to Asia and America.
 - The Portuguese and Spanish conquest and colonisation of America was under way.
 - The most powerful weapon of Spanish conquerors, was small pox which they carried to America.

- CBSE 2024, 2020**
- Human societies have become steady more interlinked.
 - Travellers, Traders, Priest and Pilgrims travelled vast distance.
 - Indus Valley civilisation was linked with west Asia.
 - Cowries were used as a form of currency.

The Making of a Global World

Features of Pre-modern World

Conquest, Disease and Colonisation

Food Travels

Silk Routes

Important aspect

- Traders and Travellers introduced new crops of the land they travelled.
- Potatoes, Soya, Maize, Ground nuts, Tomatoes, Chillies introduced in Europe and Asia after America was discovered.
- Noodles travelled west from China to become Spaghetti.

- Interconnected modern trade and cultural link between distant parts of the world.
- Most well known silk route connected China to Europe.

CHAPTER-4 PRINT CULTURE AND THE MODERN WORLD

Cheat Sheet

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The First Printed Book

- China, Japan and Korea invented the very first type of print technology, which was a hand printing system.

The First Printed Book

Contribution

Print Culture in Europe

China

- Shanghai emerged as the center of the new print culture.
- Merchants utilized printed materials extensively.
- Affluent women started to read and publish their poetry and plays.

Japan

- Buddhist missionaries introduced print technology.
- The "Diamond Sutra" is considered the oldest known book in Japan.
- The printing of visual materials fostered unique publishing practices.

The First Printed Books and Print Comes to Europe

CBSE 2020

Print Culture and the Modern World

The Print Revolution & Its Impact and The Reading Mania

Origins

- Introduction of Chinese paper to Europe in the 11th century.
- Marco Polo's introduction of woodblock printing from his travels in Asia.
- Italians began producing books with woodblocks, and soon the technology spread to other parts of Europe.

Manuscript Culture

- The production of handwritten manuscripts could not satisfy the ever-increasing demand-for books because:
 - Copying was an expensive, laborious and time-consuming business.
 - Manuscripts were fragile, awkward to handle.

First Printing Press

- Johann Gutenberg developed the printing press for the first time in the 1430's Strasbourg.
- For the printing press, he used an olive press model and molds for the letters of the alphabet.
- The first book he printed with this technology was the Bible.

The Reading Mania

Increased Literacy Rates

- Literacy rates surged in Europe through the 17th and 18th centuries.
- Churches set up schools in villages, bringing education to a broader audience.

Emergence of New Readers

- The market was flooded with books catering to new demographics, including peasants, artisans, and women.
- Pedlars sold books, reaching audiences beyond the cities and towns.

Tremble, therefore, Tyrants of the World

- People believed books as a means of spreading progress and enlightenment.
- Printing Press believed to be a means of ending despotism.

The Print Revolution and Its Impact

A New Reading Public

- Printers began publishing popular ballads and folk tales and such books would be profusely illustrated.
- Printed material was orally transmitted.

Religious Debate

- In 1517, the religious reformer Martin Luther wrote Ninety-Five Theses criticizing many of the practices and rituals of the Roman Catholic Church.
- This led to a division within the Church and the Beginning of the Protestant Reformation.

Fear of Print

- People believed this can lead to the fear of the spread of rebellious and irreligious thoughts.

Manuscripts before the age of Print

- In India, manuscripts were copied on palm leaves or on handmade paper.

Print comes to India

- In the mid-sixteenth century, the printing press first came to Goa with Portuguese missionaries.
- By 1710, Dutch Protestant Missionaries had printed 32 Tamil texts.
- James Augustus Hicky began to edit '*Bengal Gazette*' in 1780.

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Print in India

Important Aspect

Children, Women and Workers

- Children's Press was set up in France in 1857.
- Women became important as readers as well as writers.
- Penny Magazines were especially meant for women, manuals teaching proper behaviors and housekeeping.
- By mid 19th Century, *Richard M. Hoe* perfected the power driven cylindrical press.
- In the late 19th century, an offset press was developed that can print up to six colours at a time.
- By the 20th century, electrically operated presses accelerated printing operations.

The Nineteenth Century and India and the World of Print

Rise of the Novel

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- The novel as a literary form found its unique place in India, reflecting the diverse experiences and emotions of its people.
- New Literary Forms- lyrics, short stories, essays.

Women & Print

- The prevalence of reading among women rose in middle-class households.
- Rashsundari Devi authored '*Amar Jiban*', recognized as the first extensive autobiography by a woman.
- Tarabai Shinde and Pandita Ramabai penned works that examined women's lives.
- In the early 20th century, journals composed by women began to gain popularity.

Print & the Poor People

- In the 19th century, very cheap and small books were brought to markets.
- From the late nineteenth century, issues of caste discrimination began to be written about in many printed tracts and essays.
- A Kanpur mill worker published '*Sacchi Kavitaen*' under the name of '*Sudarshan Chakra*'.

Print Culture and the Modern World

New Forms of Publication

Religious Reform and Public Debates, New Forms of Publication and Print and Censorship

Religious Reforms and Public Debates

- Raja Ram Mohan Roy released a publication called '*Sambad Kaumudi*' in the year 1821.
- In response, Hindu traditionalists started publishing a paper titled '*Samachar Chandrika*' also beginning in 1821.
- Muslim communities produced translations of sacred texts in Persian and Urdu.
- A variety of religious texts began to be widely printed in local languages starting in the 1880s.

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Print and Censorship

Religious Reform and Public Debates, New Forms of Publication and Print and Censorship

Facts

- By the 1820s, the Calcutta Supreme Court passed certain regulations to control press freedom.
- In 1835, Thomas Macaulay formulated new rules that restored the earlier freedoms.
- In 1878, the Vernacular Press Act was passed, modelled on the Irish Press Laws.

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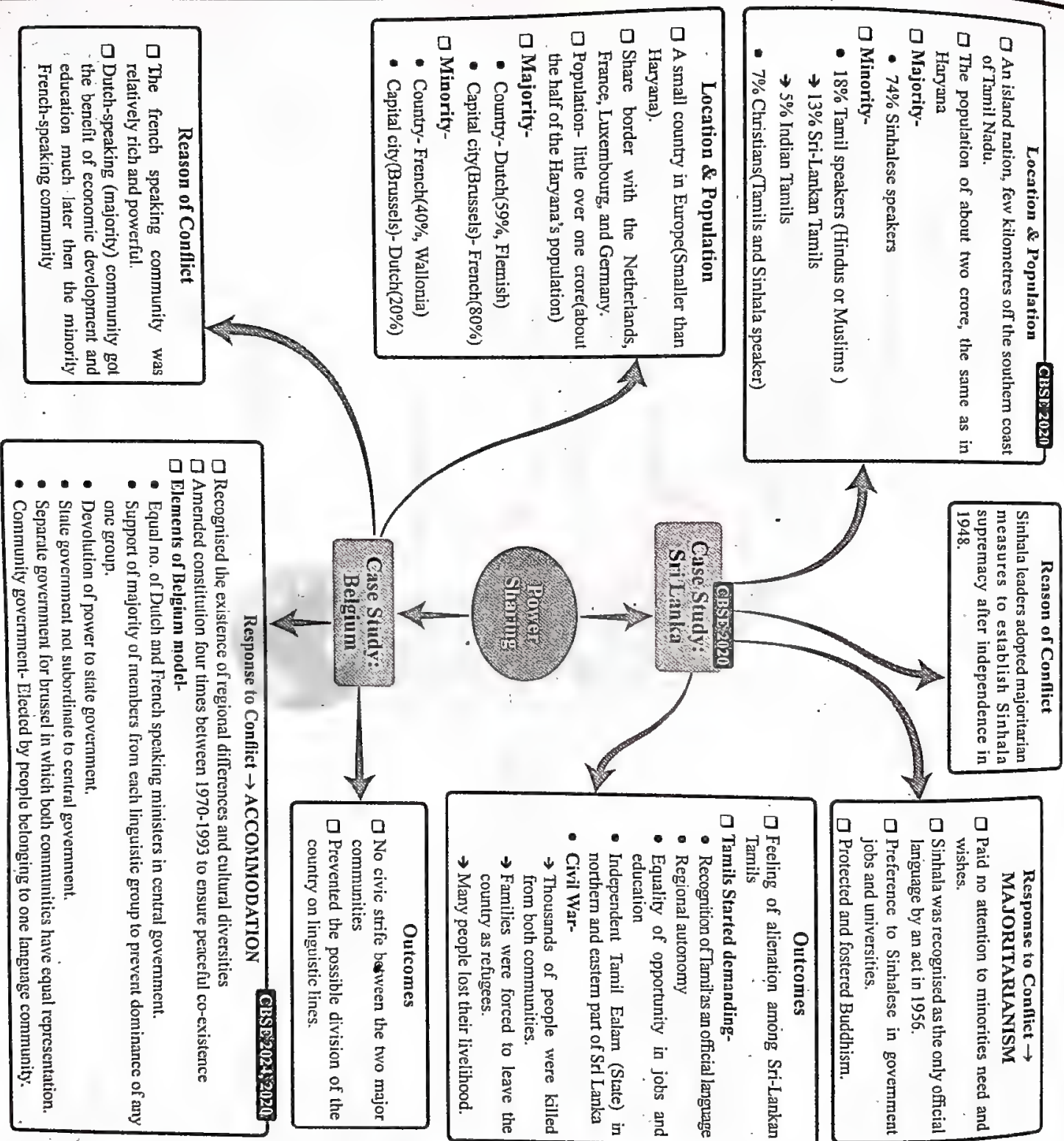
CHAPTER-1

POWER SHARING

POLITICAL SCIENCE

Cheat Sheet

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Prudential Reasons

It can lead to better outcomes like less conflict, and more stability and keep the country running smoothly.

Moral Reasons

It is the right thing to do in a democracy because it respects everyone's rights and opinions.

Why power sharing is desirable?

Power Sharing

Forms of Power Sharing

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(i) Horizontal Division of Power

- ☐ Between the different organs of the government - Legislature, Executive and Judiciary.

(ii) Vertical Division of Power

- ☐ Between the different levels of government - Central, State & Local self government.

(iii) Power Sharing among different social groups

- ☐ Between various social groups such as linguistic and religious groups.
- ☐ E.g.: Belgium's Community Government

(iv) Power Sharing among Influential groups

- ☐ Political Parties, Business men, Industrialists, Farmers Industrial workers.
- ☐ E.g.: Coalition Government.

Advantages of Power sharing

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- ☐ Bring peace, harmony and unity.
- ☐ Prevent discrimination, disintegration, conflicts and abuse of power.
- ☐ Ensure fair representation and political stability.

A system of government in which the power is divided between central authority and various constituent units.

- CBSE 2020**
- Multiple levels (tiers) of Government.
 - Each tier is accountable to the people.
 - Each level has its own jurisdiction, specified in the constitution, guaranteeing their authority.
 - Changes to fundamental provisions require the consent of both levels of Government.
 - Courts interpret the Constitution & resolve disputes between levels of Government.
 - Revenue sources for each level are specified to ensure financial autonomy.

- Coming Together Federation:**
Independent states voluntarily coming together (example -USA, Switzerland, Australia)
- Holding Together Federation:**
Large country divides power between constituent states and the national government (example - India, Spain, Belgium).

Meaning

Features

Type of federations

Independent Judiciary

Establishes a two-tier system of government namely union government (represent the country) and state government (represent a particular state). In 1992, the third tier was added with panchayats and municipalities.

Constitution

Power sharing arrangements

Amendment
Requires two-third majority in both the houses of the parliament and ratification by the legislature of at least half of the total states.

What Makes India A Federal Country?

State Government Legislate over

Power sharing arrangements between union and state government.

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Union Government Legislate over

State list - Contains subject of state and local importance. Such as police, trade, agriculture etc.
Concurrent list - Both union and state government can make laws but in case of conflict, the union government's law prevail
Special power (under article 371) - Granted to states like Assam, Nagaland, Arunachal Pradesh and Mizoram. Aim is to protect, Culture, land rights and ensure preferential employment for indigenous people.

CBSE 2021, 2023

Union list - Subjects of national importance such as defence, banking, foreign affair etc.
Concurrent list - Includes subjects of common interests to both union and state government such as education forest, trade union. In case of conflicts, union government's law prevail.
Union territories - Small areas that neither become independent state nor merge with existing States. E.g - Chandigarh, Delhi etc.
Residuary power - Subjects that do not fall in any of the three lists or all subjects that came up after the constitution was made.

- ❑ State were created based on language.
- ❑ Some states were created on the basis of culture, ethnicity or geography also.
- ❑ **Initial concerns:** Linguistic states would lead to disintegration.
- ❑ **Outcomes:** United the country and facilitated better and efficient administration.

Federalism

Linguistic states

Key Factors Behind The Success of Federalism in India

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Decentralisation

Promotes

Outcomes of Constitutional Amendment Act, 1992

India's Language Policy

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Indian constitution did not designate any language as the national language.

Use of English along with Hindi for official purpose.

22 languages were recognised as scheduled language.

Candidates in central government examinations could opt for any of scheduled language.

Each state has its own official language. Government work predominantly takes place in the respective states language.

Meaning

Transferring power from central and state governments to local government bodies.

- ❑ Local Self government Bodies - Municipalities & Municipal Corporation, Zilla Parishad, Gram Panchayat.
- ❑ Effective governance at the Grassroot level
- ❑ Democratic Participation
- ❑ Direct Participation of citizens in decision-making

- ❑ Regular Elections for local government bodies in every 5 year.
- ❑ Seats are reserved in elected bodies and the executive heads of these institutions for the SCs, STs and OBCs.
- ❑ At least 1/3rd of all positions are reserved for women.
- ❑ Independent state election commissions conduct panchayats & municipal elections.
- ❑ State government required to share powers & revenue with local government bodies.

Gender, Religion and Caste

Basis of Social Differences

Religion

Religious Division

Communalism

Biological difference between males and females.

Meaning

Gender division of labour

Women in India

CBSE 2023, 2020
Gender

□ **Meaning:** Social division under which unequal roles are assigned.

▲ **Males:**

Roles Assigned: Earning and all the work outside home.

Result: Men becoming more powerful enjoying greater freedom and social respect.

▲ **Females:**

Roles Assigned: Household work, cooking, taking care of kids etc.

Result:

Minimum role in public life, women confined to home, no freedom

Womens started demanding for voting rights, enhancement in political and legal status, improvement in educational and career opportunities, equality in personal and family life. It led to Improvement in women's role in public life.

□ **Status in Society** Indian women have low respect in society due to patriarchal society.

□ **Literacy Rate:** only 54% compared with 76% among men

□ **Unpaid Work:** Women works one hour more than men but do not get paid for household work.

□ **Wage Difference:** Despite of Equal Remuneration Act 1976, women workers get less pay than men for equal work.

□ **Child Sex Ratio:** Girl child is aborted due to preference of male which led to a decline in child sex ratio (914 girls per 100 boys).

□ **Violence against Women:** Exploitation, harassment and violence against women have increased in urban areas.

□ **Political Representation:** Proportion of women in legislature is low.

□ **Reservation of Seats:** In 1992, 1/3rd seats in local government bodies is reserved for women (the same proposal for reserved seats in Lok Sabha and state legislature is pending in parliament). Now, there are more than 10 lakh elected women representatives in rural and urban local bodies.

Meaning:

□ Division of society on the basis of religion

□ Leads to discrimination and oppression of minorities

□ Also leads to Communalism.

Meaning

□ When one community tries to promote itself on the cost of the other.

□ **Communal Politics:** Using religion in politics to gain dominance

□ **Forms of communalism:**

▲ Religious beliefs in the superiority of one's religion

▲ Use of sacred symbols, religious leaders, emotional appeal in politics

▲ Communal violence, riots, massacre between different communities

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Gender, Religion and Caste

Gender

Religion

Basis of Social Differences

Caste

- ❑ Caste inequalities create social division
- ❑ In India, untouchability is an extreme form of casteism
- ❑ Government prohibited untouchability.
- ❑ Urbanisation and occupational mobility reduced caste hierarchy.

Brief

India as a Secular State

- ❑ No official religion, of the country
- ❑ People have freedom to practice, follow and propagate their religion
- ❑ No discrimination on the basis of religion.

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Caste in Politics

Politics is Caste

Meaning:

- ❑ Using caste in politics to gain dominance
- Negative Aspect**
 - ▲ Parties choose candidate according to caste composition of the electorate and not on qualification basis.
 - ▲ Parties favour a particular caste to gain support
- Positive Aspect**
 - ▲ Lower caste got the better representation in the government.
 - ▲ Everyone gets a fair chance to contest in the elections

CBSE 2020

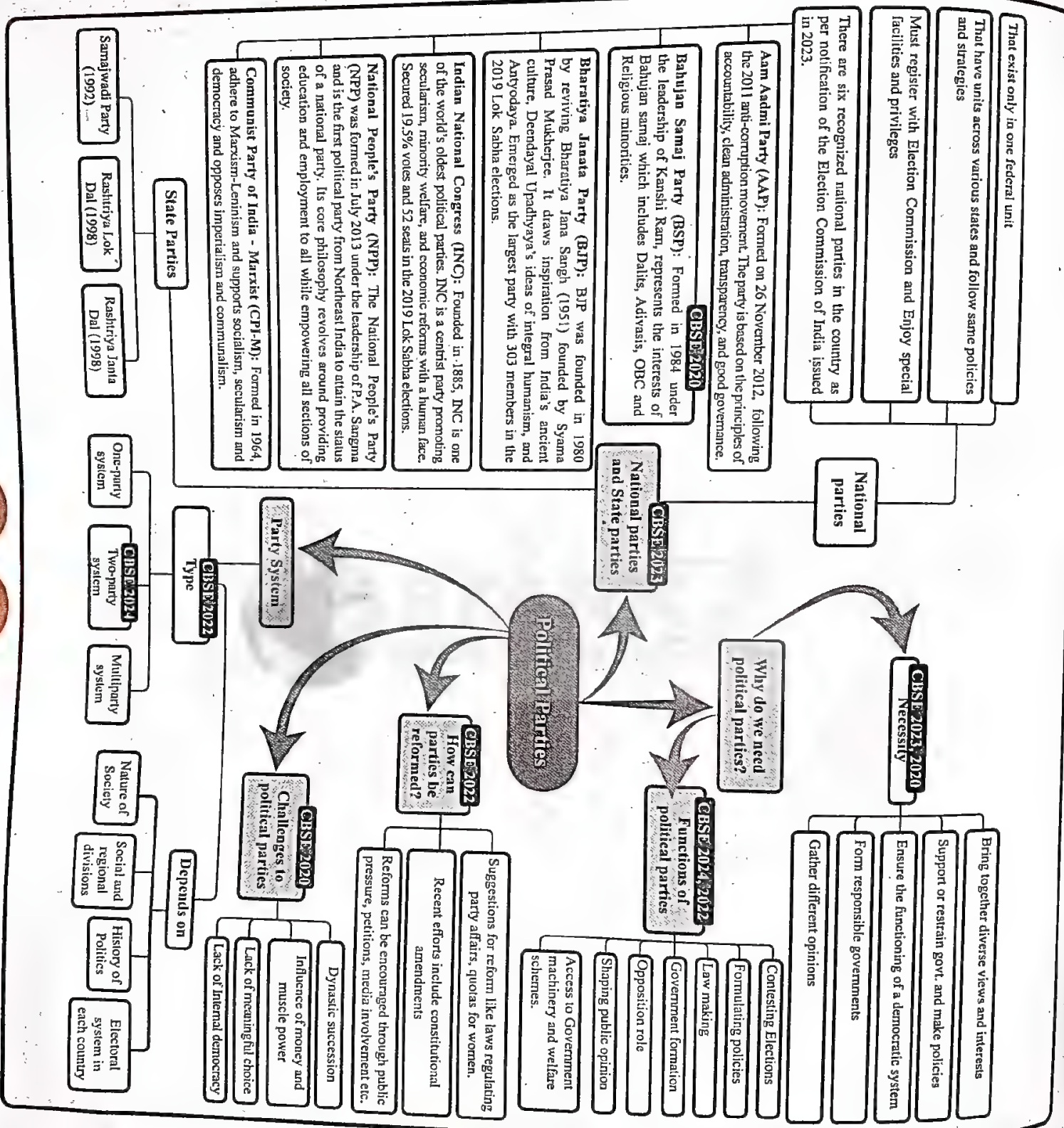
Influence of politics in caste:

- ❑ Each caste tries to gather more subcaste to increase its number
- ❑ One caste may make alliance with other castes to gain political support
- ❑ New kind of caste group such as 'backward' and 'forward' caste has emerged.

CHAPTER-4 POLITICAL PARTIES

Cheat Sheet

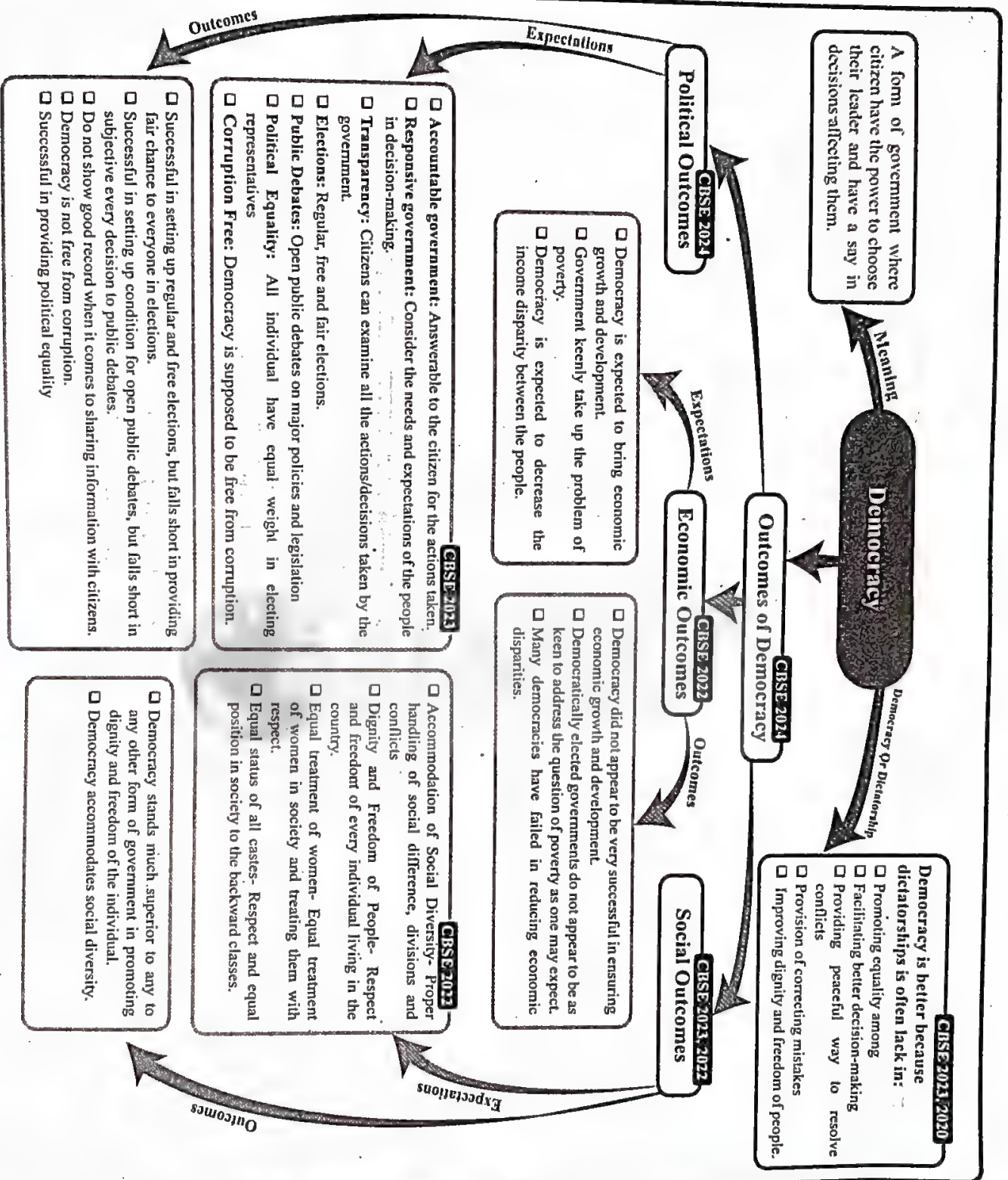
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CHAPTER-5 OUTCOMES OF DEMOCRACY

Cheat Sheet

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CHAPTER-1 RESOURCES AND DEVELOPMENT

Cheat Sheet

GEOGRAPHY

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Soil Erosion: The removal of the topsoil by water, wind, or other natural forces, leading to reduced soil quality and land degradation.

Soil Conservation: Methods to protect soil from erosion and maintain its fertility, including planting trees, contour ploughing, and terrace farming.

Technologically accessible, economically feasible & culturally acceptable can be termed as a resource.

Essential for the future as resources are limited in supply. The Major Problems of indiscriminate are Ecological Problems, Depletion of resources, Scarcity of resources, and Unequal distributions

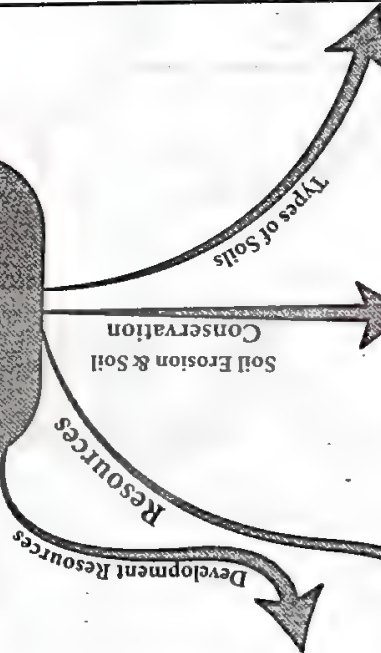


- Alluvial Soil (Region: eastern coastal plains and deltas of Mahanadi Godavari, etc.)
- Black Soil (Region: Deccan Trap Malwa, MP, Saurashtra)
- Forest Soil (Region: Jammu and Kashmir and other mountainous regions)
- Red and Yellow Soils (Region: Odisha, Chhattisgarh southern Deccan plateau)
- Arid Soil (Region: Rajasthan parts, of Gujarat)
- Laterite Soil (Region: Maharashtra, Bengal)



- **Forests:** Land under forest, i.e. 22.78%
- **Land not available for cultivation:** Barren and wasteland, Land put to non-agricultural uses, e.g. buildings, roads, factories, etc.
- **Other uncultivated land:** Permanent pastures and grazing land, Land under miscellaneous tree crops groves, Culturable wasteland.
- **Fallow lands:** Left without cultivation for one or less than one agricultural year, left uncultivated for the past 1 to 5 agricultural years.
- **Net Sown Area:** Area sown more than once in an agricultural year plus net sown area is known as gross cropped area.

Resources and Development



Development Resources

Soil Erosion & Soil Conservation

Types of Soils

Resource Planning in India

Land Use Pattern in India

Land Under Important Relief Features

CBSE 2023

CBSE 2020

CHAPTER-2 FOREST AND WILDLIFE RESOURCES

Cheat Sheet

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Forest and Wildlife Resources

Sacred Groves
Forest areas that are protected by local communities due to their religious significance.

Types and Distribution of Forest and Wildlife Resources

- ❑ In India, much of its forest and wildlife resources are either owned or managed by the government through the Forest Department or other government departments.
- ❑ Classification of forests:
 - Reserved Forests: Most valuable forests, cover half of the total forest land.
 - Protected Forests: Protected from any further depletion, one third of total forest area.
 - Unclassed Forests: Other forests and wastelands belong to both govt. and private individuals and communities.

Project Tiger-1973

- ❑ Tiger is one of the key wildlife species in the faunal web.
- ❑ The tiger population plummeted from 55,000 at the beginning of the 20th century to 1,827 by 1973.
- ❑ Threats to tigers include poaching, habitat loss, prey depletion, and human population growth.
- ❑ India and Nepal, home to two-thirds of the world's tigers, face significant challenges from poaching and illegal trade.

Biodiversity or Biological Diversity
Biodiversity is the variety of all living forms and their ecosystems on Earth.

Flora
Flora represents all the plant life in a certain area, including various types of plants like trees and flowers.

Fauna
Fauna means all the animal life in a specific area, including different animals like tigers, birds, and insects.

Causes of Depletion of the Flora and Fauna

- ❑ The various factors that cause depletion of the flora and fauna
 - Large-scale development projects
 - Shifting cultivation
 - Mining
 - Grazing and fuel-wood collection
 - Over-population
- ❑ Factors responsible for decline in India's biodiversity
 - Habitat destruction
 - Hunting
 - Poaching
 - Over-exploitation
 - Environmental pollution
 - Poisoning

- ❑ Human beings transformed nature into a resource obtaining directly and indirectly from the forests and wildlife such as wood, barks, leaves, rubber, medicines, dyes, food, fuel, fodder, manure, etc. which depleted our forests and wildlife.

Conservation of Forest and Wildlife in India

Conservation: Preserves the ecological diversity and our life support systems – water, air and soil.

- ❑ The Indian Wildlife (Protection) Act of 1972 was enacted to safeguard endangered species by prohibiting hunting, protecting habitats, and limiting wildlife trade.
- ❑ National parks and wildlife sanctuaries were established by central and state governments.
- ❑ The government launched protection projects for critically threatened animals, including tigers, one-horned rhinoceroses, Kashmir stags, three types of crocodiles, Asiatic lions, and more.
- ❑ By 1986, protections were extended to include hundreds of butterflies, moths, beetles, and a dragonfly.
- ❑ In 1991, plants were added to the protection list for the first time, starting with six species.

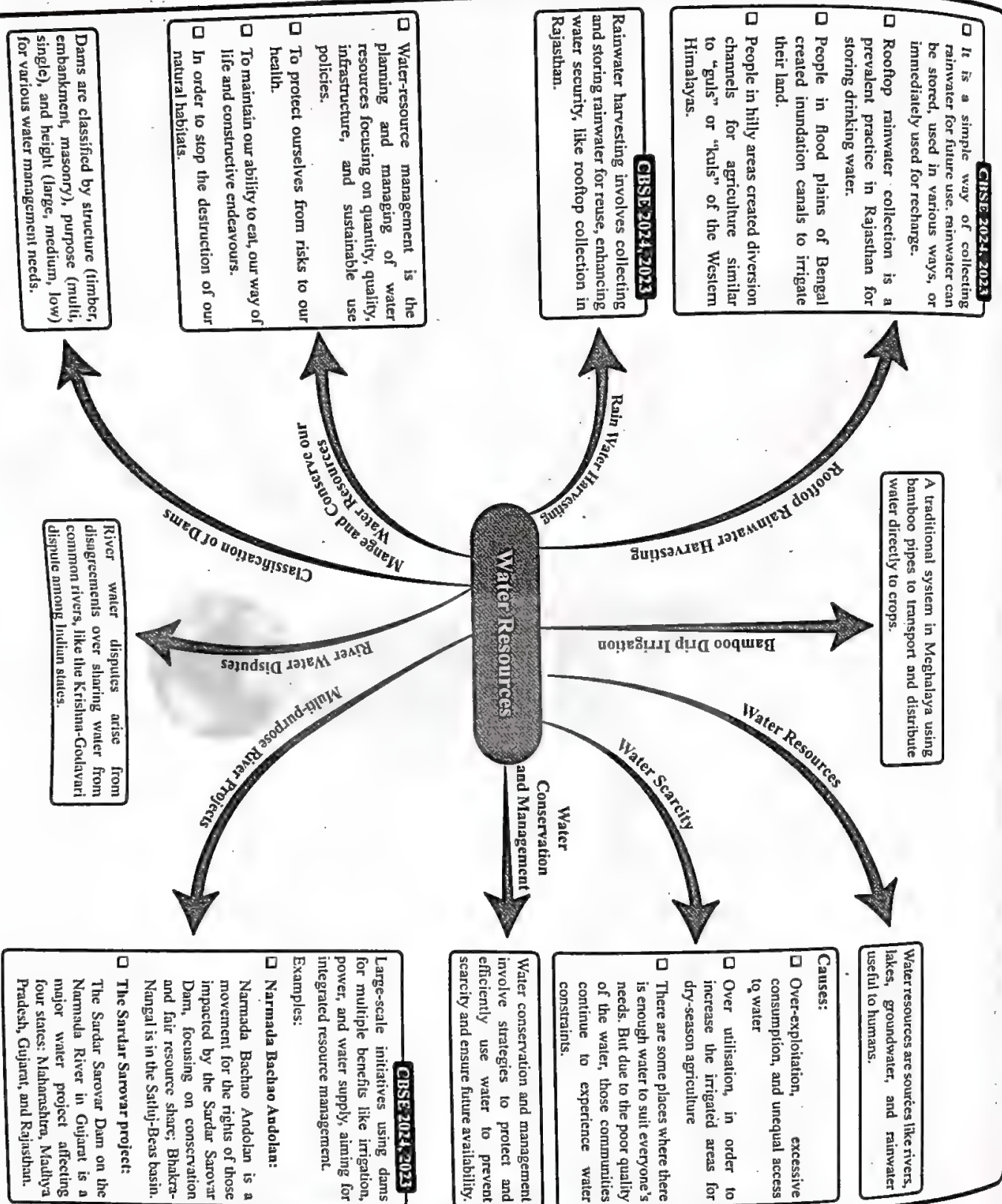
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CHAPTER-3

WATER RESOURCES

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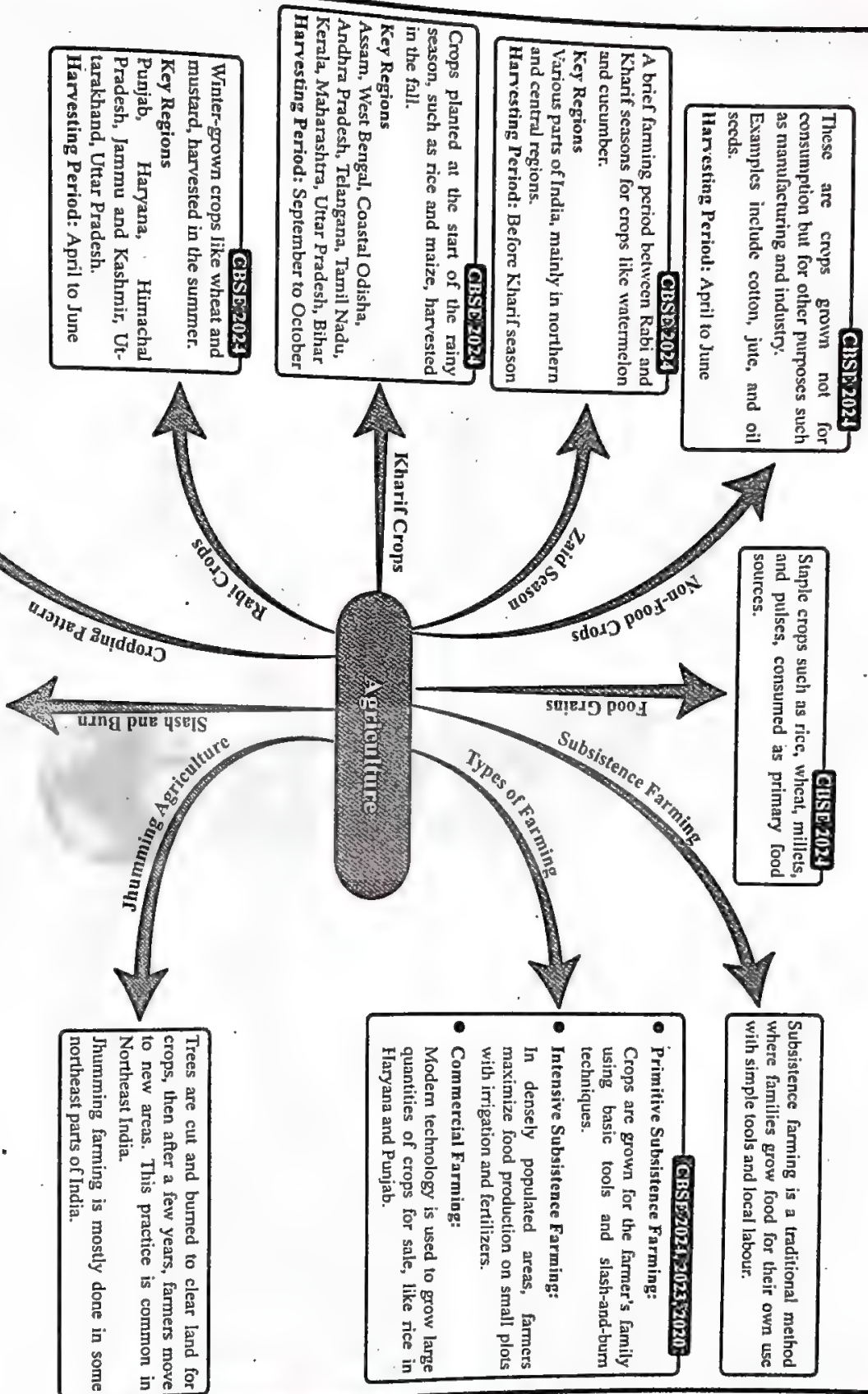


CHAPTER-4

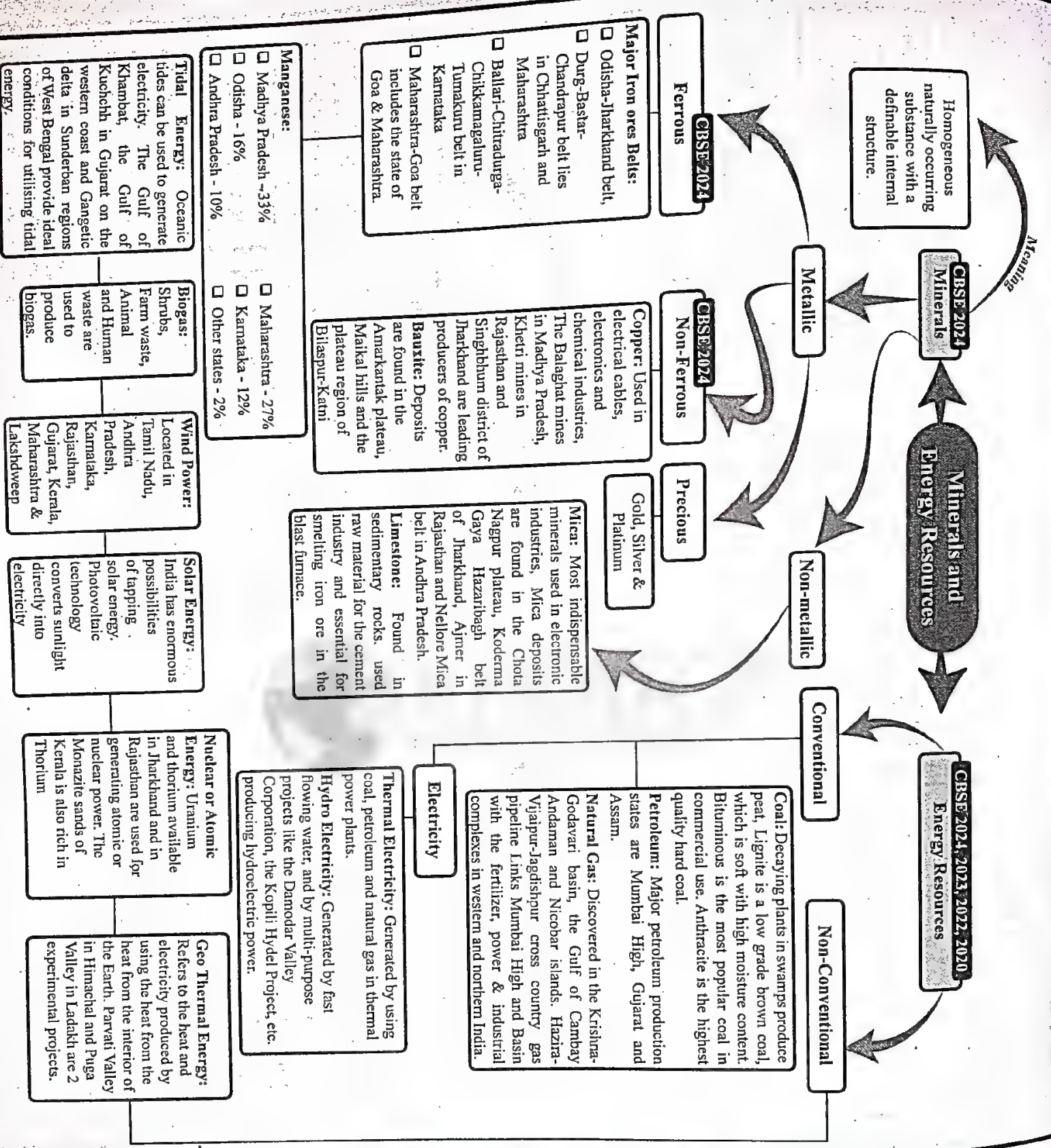
AGRICULTURE

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CHAPTER-5 MINERALS AND ENERGY RESOURCES



Cheat Sheet

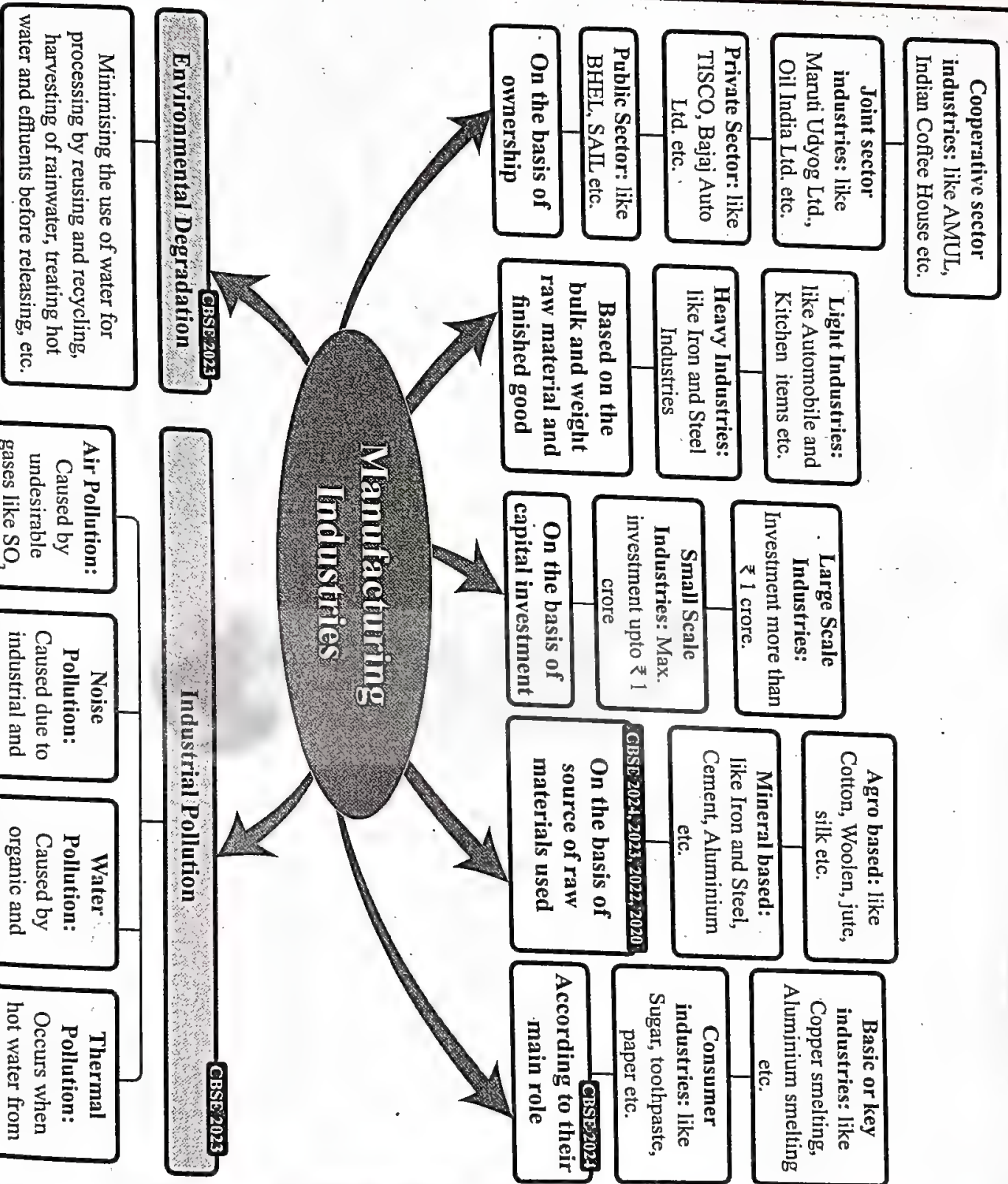
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CHAPTER-6 MANUFACTURING INDUSTRIES

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Industrial Pollution

GBSE 2023

GBSE 2024, 2023, 2022, 2020

GBSE 2023

GBSE 2023

Air Pollution:

Caused by undesirable gases like SO_2 and CO_2

Noise Pollution:

Caused due to industrial and construction activities.

Water Pollution:

Caused by organic and inorganic industrial wastes discharged into rivers.

Thermal Pollution:

Occurs when hot water from factories and thermal plants drained into rivers and ponds.

CHAPTER-7 LIFELINES OF NATIONAL ECONOMY

Major Sea Ports

Lifelines of National
Economy

International Airports

CRSE 2024, 2023, 2020

- ☐ Kandla (Gujarat)
- ☐ Mumbai (Maharashtra)
- ☐ Mormugao (Goa)
- ☐ New Mangalore (Karnataka)
- ☐ Kochi (Kerala)
- ☐ Tuticorin (Tamil Nadu)
- ☐ Chennai (Tamil Nadu)
- ☐ Vishakhapatnam (Andhra Pradesh)
- ☐ Paradip (Odisha)
- ☐ Haldia (West Bengal)

CRSE 2023, 2022, 2020

- ☐ Amritsar (Raja Sansi - Sri Guru Ram Dass Jee),
- ☐ New Delhi (Indira Gandhi International),
- ☐ Mumbai (Chhatrapati Shivaji),
- ☐ Chennai (Meyyan Bakkan),
- ☐ Kolkata (Netaji Subhash Chandra Bose),
- ☐ Hyderabad (Rajiv Gandhi)

MAJOR PORTS
OF INDIA



INTERNATIONAL
AIRPORTS



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CHAPTER-1

DEVELOPMENT

ECONOMICS

Cheat Sheet

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Income Goals, What people desire is regular work, Better wages and decent prices for their crops or other products that people produce.

CBSE 2021, 2023

Characteristics of Development Goals

- More equitable distribution of resources.
- Different people have different aspirations for & nations of development.
- Each person seeks a different goal.
- Development goals can be conflicting.

Characteristics of Mixed Goals

- Thinking about Equality.
- Better lifestyle through better administration and principles.
- Freedom, Money, etc.

Refers to the process by which an individual grows and changes throughout the life cycle.

- Continuous process
- Income as an essential component
- Mixed goals
- Conflicting goals etc.

Meaning and Characteristics

Development

Development Goals and Mixed Goals
Income and Other Goals
National Development

Sustainable Development
Human Development Report
Public Facilities

CBSE 2024, 2023, 2022 Term-II, 2020

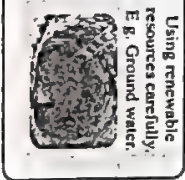
Sustainable
Maintain for long term of time (for future generation)

Economic Development
(for current generation)

Balance use of Natural Resources



Conservation & finding alternatives of non-renewable resources. Eg. Petrol.



Using renewable resources carefully. E.g. Ground water.

Features of Sustainable Development

- Efficient use of natural resources.
- No 1 in the pollution.
- Improve Quality of human life.
- To fulfill the requirements of future generations.

Pillars of Sustainable Development

- Social Sustainability
- Economics Sustainability
- Environmental Sustainability

CBSE 2024, 2023, 2022 Term-II, 2020

It means thinking about a fair and just path for all, like Social Economic & Political welfare of the people.

How to compare different Countries:

On the basis of Development & Per Capita Income.

How to compare different States:

On the basis of Income, Infant mortality rate, Literacy rate & Net attendance ratio.

Average Income: Average earnings per person in a specific area within a specific time frame. The average income is also called Per Capita Income.

Average Income or Per Capita Income is calculated:

$$\frac{\text{Per Capita Income}}{\text{Total Income}} = \frac{\text{Total Income}}{\text{Total Population}}$$

Income and Other Criteria

Comparing states on the basis of (Haryana, Kerala, & Bihar)

Per Capita Income - Highest Haryana (22,36,147) & Lowest Bihar (240,982)

Infant mortality rate - Highest Bihar (32) & Lowest Kerala (7)

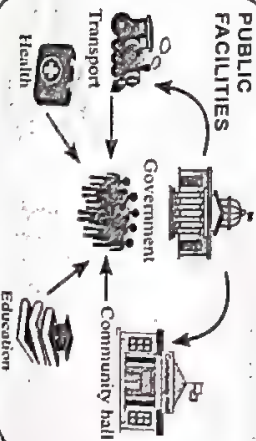
Literacy Rate % - Highest Kerala (94%) & Lowest Bihar (62%)

Net Attendance Ratio - Highest Kerala (83) & Lowest Bihar (43)

CBSE 2023, 2020

Provided facilities by the government. E.g. Schools, Hospital, Community Halls, Transport, Electricity etc. These facilities are important as we cannot purchase every major facility.

PUBLIC FACILITIES



CBSE 2020

Human development Report was introduced by UNDP. [United Nations Development Programme] in 1990.

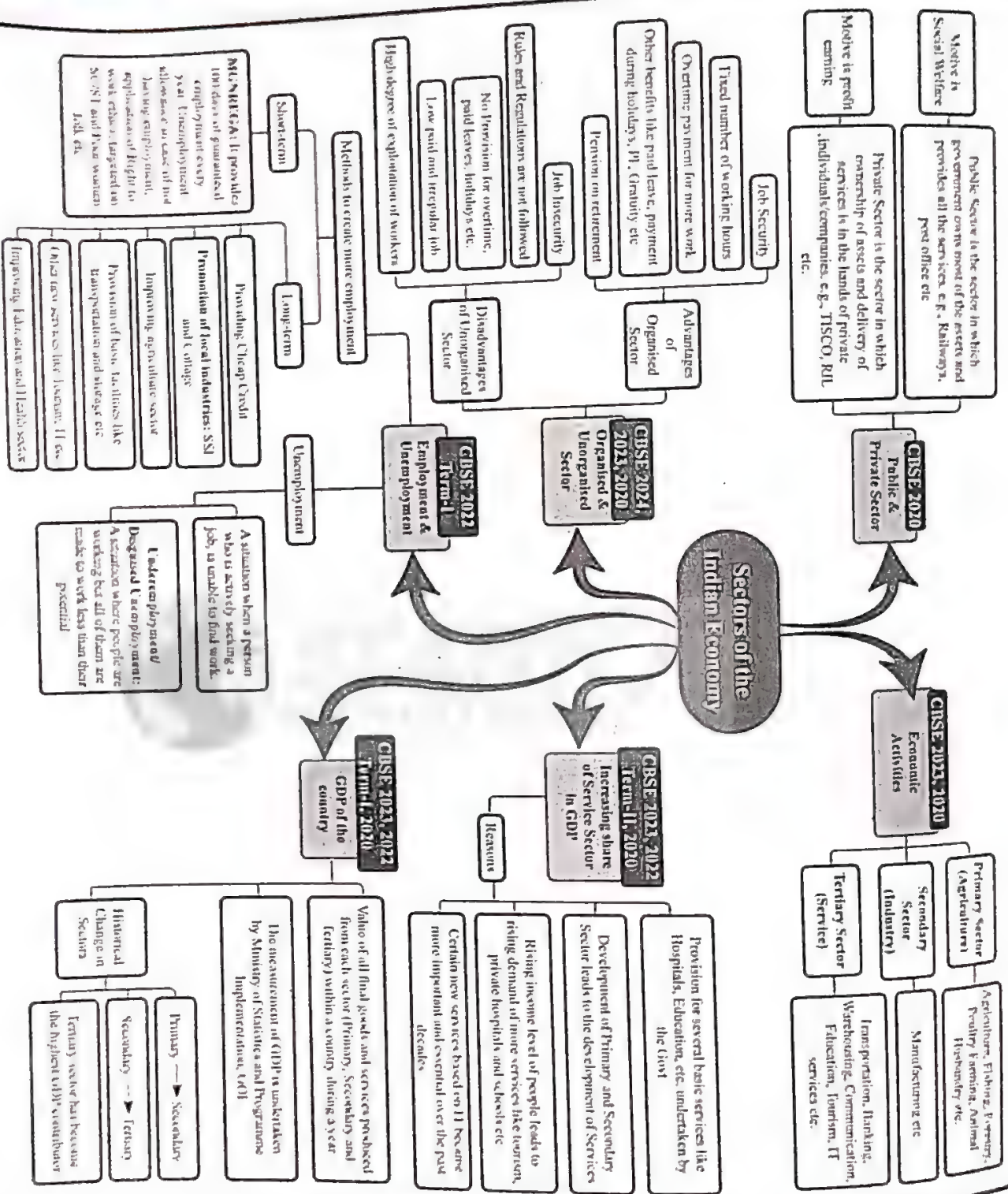
Components of Human Development Index

- Living Standard (Per Capita Income)
- Health Indicator (Life Expectancy at Birth)(BMI)
- Body Mass Index (BMI) = $\frac{\text{Weight in kilogram}}{(\text{Height in meter})^2}$
- Education Indicator (Literacy rate, Enrollment ratio)

Other Elements

- Consumption
- Health
- Environment
- Freedom
- Security, etc.

CHAPTER-2 SECTORS OF THE INDIAN ECONOMY



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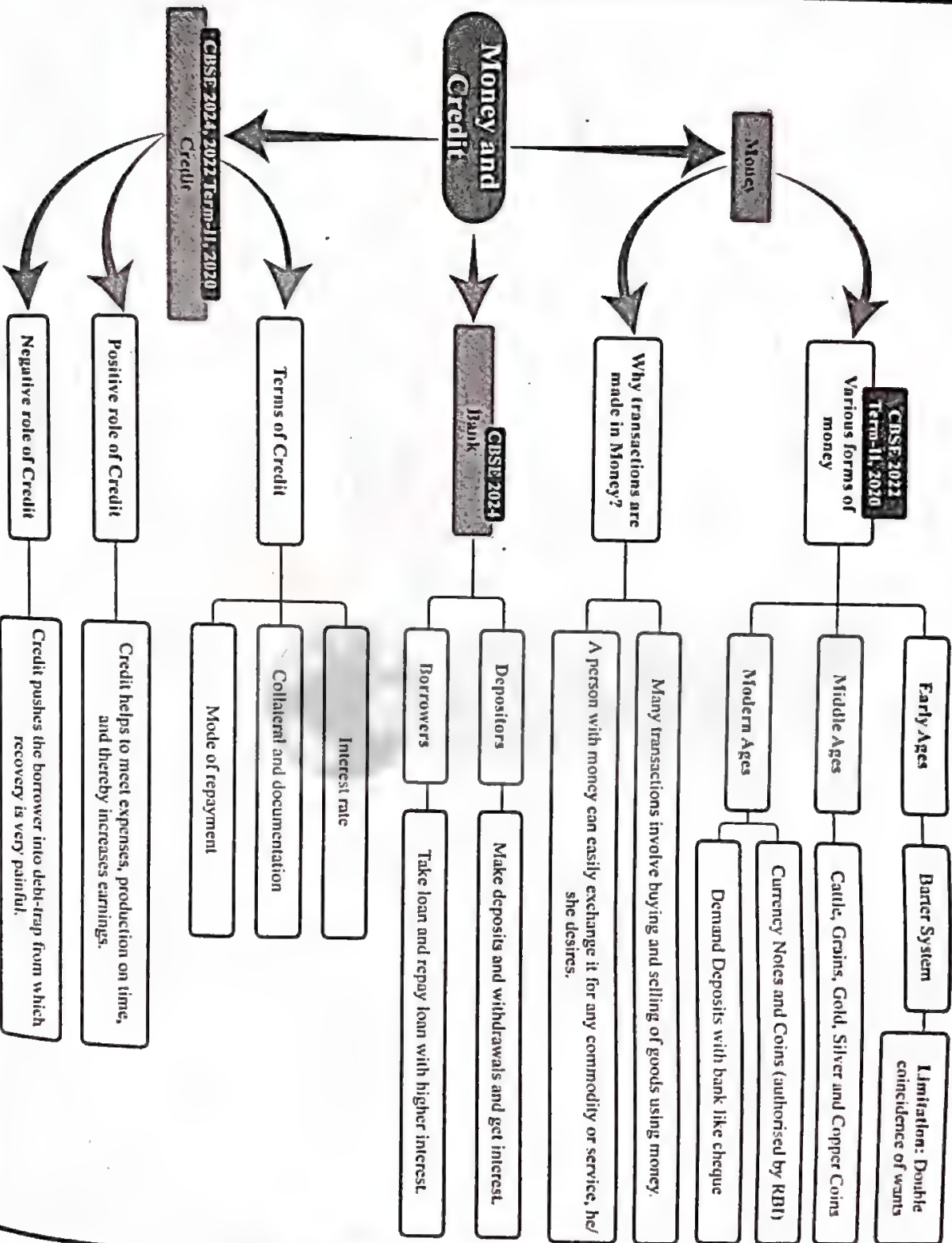


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CHAPTER-3 MONEY AND CREDIT

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Money and Credit

CBSF 2023, 2022 Term-II
Self Help Group

Advantages

- Gender Equity
- Social Integrity
- Impact on housing & health
- Improvement in standard of living
- Women empowerment etc.

Disadvantages

- Dependence on group participation
- Lack of upgrading skills & professional guidance
- Lack of qualified facilitators
- Limited availability, inadequate financial assistance
- Too much depend on Govt. NGOs etc.

Functions

- Offer collateral-free loans
- Build the functional capacity
- Initiate and maintain savings
- Resolves conflicts, common problems, etc.

Purpose

- Rural areas depend on informal sectors
- Poverty relief
- Improve social status etc.

CBSF 2024, 2023, 2022 Term-II
Credit sources of India

Formal Sector

Refer to those sources that are regulated by the government and are subject to legal requirements & formalities.

- Lower Interest Rates
- E.g., Cooperative Banks, etc.
- Requires documentation and collateral.

Informal Sector

Refer to those sources that are not regulated by the government are based on personal relationships & trust.

- Higher Interest Rates
- E.g., Money lenders, landlords, relatives etc.
- Not requires documentation and collateral.

CHAPTER-4

GLOBALISATION AND THE INDIAN ECONOMY

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CBSE 2024
It is the process of rapid integration and interaction among people, companies, and governments worldwide.

Liberalisation of Foreign Trade & Foreign Investment

Technology

CBSE 2024, 2023, 2020

Factors

Meaning

Factors Enabling Globalisation

Globalisation and the Indian Economy

Early Phase

Modern Phase

Colonial Countries (e.g. India)

Industrial Developed Countries (e.g. European Countries and USA)

Raw material

Export

Import

Finished products

MNC: A multinational corporation (MNC) is a corporation that owns or controls production in more than one country.

Offices and Factories

Located where cheap labour and other Resources available i.e., Minimum Cost of Production and Maximum profit.

CBSE 2022 Term-II
Role of MNCs

Spread production

Influence local markets

Global production chains

Most Probable Questions (Analyzed & Selected)

To Access Detailed Explanation
Scan This QR Code



Note: Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.

Economics

1. Development

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).
- Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (A) is true, but (R) is false.
- (A) is false, but (R) is true.

1. Assertion (A): Job security is more important than high pay for people seeking employment.

Reason (R): People consider factors such as facilities for their family, working atmosphere, and opportunities to learn before accepting a job. (1 M)

2. Assertion (A): Public facilities are essential for the development of a country.

Reason (R): Public facilities such as roads, hospitals, and schools provide essential services and infrastructure that contribute to the development of a country. (1 M)

3. Suppose there are four families in your locality, the average per capita income of whom is ₹10,000. If the income of three families is ₹6,000, ₹8,000, and ₹14,000 respectively, what would be the income of the fourth family? (1 M) (2022 Term-II)

- ₹15,000
- ₹12,000
- ₹14,000
- ₹10,000

4. Read the following data and answer the question that follow: (1 M) (2023)

Some comparative Data on Haryana,
Kerala and Bihar

| State | Infant Mortality Rate (per thousand person) | Literacy Rate % | Net Attendance Ratio (per 100 person) |
|---------|---|-----------------|---------------------------------------|
| Haryana | 30 | 82 | 61 |
| Kerala | 7 | 94 | 83 |
| Bihar | 32 | 62 | 43 |

How much is the Net Absence Ratio of Haryana? Choose the appropriate option from the following:

- 39
- 27
- 38
- 18

- Define the term 'literacy rate'. (1 M) (2020, 2015)
- How does the United Nations Development Program's (UNDP's) developmental criterion differ from the World Bank? Explain. (2 M) (2024)
- "Different persons can have different developmental goals." Support the statement with an example. (2 M) (2023, 2019, 2018)
- Why is the issue of sustainability important for development? Explain with examples. (3 M or 5 M) (2024, 2023, 2020)
- What is human development? Explain its indicators. (5 M) (2020, 2015)
- How has the World Bank classified countries? What are the limitations of this report? (5 M) (2017, 2016)

Competency Based Questions

- Development as Freedom is Amartya Sen's first book after receiving the Nobel and the most widely read of all of his works. Based on the author's World Bank Fellow Lectures in 1996, this descriptive, non-technical overview of welfare economics argues that 'development' should be viewed not in terms of economic measures (e.g. GDP

growth, average annual income) but in terms of the real 'freedoms' that people can enjoy such as economic facilities and social opportunities. Sen describes human freedom as both the primary end objective and the principal means of development; economic measures are merely the means to this end. Sen frames development as the realisation of freedom and the abolishment of 'unfreedoms' such as poverty, famine, and lack of political rights.

Source: Terjesen, Siri. (2004). *Amartya Sen's Development as Freedom*.

In present-day Indian society, which of the following people would be the MOST 'unfree' as defined in this passage? (1 M)

- Arvind, a shopkeeper who cannot afford to move from his 3 bedroom flat to a bigger house
- Afreen, a woman who is not allowed to pursue education
- Hiralal, a farmer has insurance against crop failure due to famine
- Anjana, a 15-year old, who does not have voting rights

12. Study the data given below: (1 M)

| Country | Total GDP | GDP Per Capita |
|---------------|----------------------|----------------|
| United States | \$25,462,700,000,000 | \$75,269 |
| China | \$17,963,200,000,000 | \$12,598 |

Source: <https://www.worldometers.info/gdp/gdp-by-country/>

Despite having a higher total Income than the United States, China has a lower per capita Income. What is the reason for this? (1 M)

- United States has a more equitable distribution of income
- China has more rich people than the poor people
- China has a smaller population than United States
- China has a bigger population than United States

13. Read the following paragraph and answer the questions.

Human Development Report 2023-24

Drawing from the latest Human Development Report (2023-24) titled "Breaking the Gridlock: Reimagining Cooperation in a Polarized World," India's progress is evident with an improvement in its Human Development Index (HDI) value to 0.644 in 2022. This places the nation at rank 134 out of 193 countries. The report underscores the advancements across various HDI indicators for India, such as a rise in life expectancy from 67.2 to 67.7 years, an increase in expected years of schooling to 12.6, and a boost in Gross National Income (GNI) per capita from \$6,542 to \$6,951.

The 2023-2024 HDR builds on the 2021-2022 Human Development Report findings

| Indicator | Value in 2021 | Value in 2022 | Change |
|--|---------------|---------------|------------------------|
| Human Development Index (HDI) | - | 0.644 | Improvement |
| Rank among countries | - | 134/193 | - |
| Life Expectancy at Birth (years) | 67.2 | 67.7 | Increased by 0.5 years |
| Expected Years of Schooling | - | 12.6 | - |
| Mean Years of Schooling | - | 6.57 | - |
| Gross National Income (GNI) per capita (USD PPP) | \$6,542 | \$6,951 | Increased by \$409 |

Despite global HDI reaching record highs, disparities remain, with rich countries making robust recoveries, while half of the world's poorest have not yet regained their pre-crisis HDI levels. This illustrates a divided recovery, highlighting the urgency to address this through collective global action. The HDR emphasizes that India, like the Asia-Pacific region, has stood out for human development progress since 1990, yet it faces the challenge of significant gender gaps in labor force participation and other inequalities that need focused attention to achieve a more equitable future (UNDP) (HDR.) (UNDP).

Source: <https://www.undp.org/>

- What was India's Human Development Index (HDI) value in the 2023-24 report? (1 M)
- How much did India's Gross National Income (GNI) per capita increase according to the 2023-24 report? (1 M)
- Discuss the significance of the progress in India's HDI value in relation to global disparities highlighted in the 2023-24 Human Development Report. Evaluating. (2 M)

2. Sectors of Indian Economy

Direction: Questions (1-2) consist of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).

- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 (c) (A) is true, but (R) is false.
 (d) (A) is false, but (R) is true.

1. Assertion (A): The primary sector is the most important sector in developing countries.

Reason (R): Developing countries have a large population engaged in agriculture, mining, and other primary activities, which contribute significantly to their GDP.

(1 M)

2. Assertion (A): The organised sector provides better working conditions than the unorganised sector in India.

Reason (R): Organised sector activities such as formal employment, large-scale manufacturing, and corporate services offer better wages, job security, and social security benefits compared to informal activities.

(1 M)

3. Which one of the following pairs is correctly matched?

(1 M) (2023)

- (a) Primary Sector - Flower Cultivator
 (b) Secondary Sector - Milk Vendor
 (c) Tertiary Sector - Fisherman
 (d) Manufacturing Sector - Gardener

4. Which one of the following sectors contribute highest in the GDP of India?

(1 M) (2023)

Or

Which one of the following sectors shows the highest share of Gross Domestic Product (GDP) in India?

(1 M) (2022 Term-II)

- (a) Primary (b) Secondary
 (c) Tertiary (d) Quaternary

5. Examine the role of Tertiary sector in the development of the country.

(3 M) (2024, 2016)

6. Why is there a need to protect workers in the Unorganized Sector?

(3 M) (2023, 2020)

7. "Tertiary sector activities help in the development of the primary and secondary sectors." Evaluate the statement.

(1 M or 3 M) (2020, 2016)

Or

Which sector helps in the development of the primary and secondary sectors?

8. Distinguish the service conditions of organized sector with that of unorganized sector.

(2 M, 3 M or 5 M) (2024, 2020, 2019, 2018)

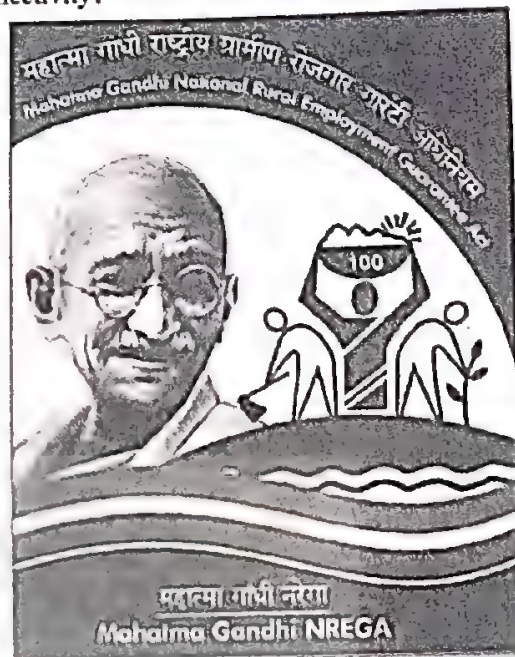
9. Why is 'Tertiary Sector' becoming important in India? Explain.

(3 M or 5 M) (2023, 2020, 2019)

Competency Based Questions

10. Ramesh lives in a small village that suffers from water shortages and poor connectivity to nearby towns, especially during the monsoon season. The village council is discussing ways to improve the infrastructure and overall quality of life for its residents. During the meeting, one of the council members suggests utilizing MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) funds. How can MGNREGA help Ramesh's village improve its infrastructure and address the issues of water shortage and connectivity?

(1 M)



- (a) By constructing urban roads and highways
 (b) By building schools and hospitals in cities
 (c) By creating assets like wells, ponds, and roads in villages
 (d) By providing free electricity to rural households
11. In a rural area, a family is struggling to find steady employment. They learn about a government program called MGNREGA, which promises a certain number of days of work each year. The head of the family says, "This program guarantees us the right to work." Why does the head of the family think MGNREGA 2005 is referred to as 'Right to work'?

(2 M)

12. Kanta works in an office. She attends her office from 9.30 a.m. to 5.30 p.m. She gets her salary regularly at the end of every month. In addition to the salary, she also gets a provident fund as per the rules laid down by the government. She also gets medical and other allowances. Kanta does not go to the office on Sundays. This is a paid holiday. When she joined work, she was given an appointment letter stating all the terms and conditions

of work. Kamal is Kanta's neighbour. He is a daily wage labourer in a nearby grocery shop. He goes to the shop at 7:30 in the morning and works till 8:00 p.m. in the evening. He gets no other allowances apart from his wages. He is not paid for the days he does not work. He has therefore no leave or paid holidays. Nor was he given any formal letter saying that he has been employed in the shop. He can be asked to leave anytime by his employer



- (i) Kanta receives a provident fund as part of her employment benefits. Explain how the provident fund system contributes to the financial security of employees in the organized sector. (1 M)
- (ii) Propose a set of policies that could improve job security and benefits for workers like Kamal in the unorganized sector. (1 M)
- (iii) Evaluate the effectiveness of government regulations on employment benefits, such as provident funds and medical allowances, using Kanta's employment situation as a reference. How might these regulations be improved? (2 M)

3. Money and Credit

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
 - (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - (c) (A) is true, but (R) is false.
 - (d) (A) is false, but (R) is true.
1. **Assertion (A):** Secured loans require collateral, while unsecured loans do not.
Reason (R): Collateral provides security for lenders and reduces the risk of default by borrowers. (1 M)
 2. **Assertion (A):** Informal sector loans are preferred by borrowers as they have easier repayment terms.
Reason (R): Formal sector loans have strict repayment schedules that are difficult for borrowers to follow. (1 M)

3. Which among the following issues currency notes on behalf of the Central Government? (1 M) (2020)
 - (a) State Bank of India
 - (b) Reserve Bank of India
 - (c) Commercial Bank of India
 - (d) Union Bank of India
4. Who among the following takes the decision regarding saving and loan activities in the Self Help Groups (SHGs)? (1 M) (2023)
 - (a) Manager of a Bank
 - (b) Members of Non-Governmental Organisation (NGO)
 - (c) Local Money Lenders
 - (d) Members of Self-Help Group (SHG)
5. Highlight the inherent problem in double coincidence of wants. (1 M) (2017, 2015)
6. 'Formal sector of credit better than informal sector.' Give arguments in support of your answer. (3 M) (2024, 2019)
7. Distinguish between formal and informal sources of credit. (3 M) (2023, 2022 Term-II)
8. In what ways does the Reserve Bank of India supervise the functioning of banks? Why is this necessary? (2 M or 3 M) (2019, 2012)
9. Why is it necessary to for the banks and cooperative societies to increase their lending facilities in rural areas? Explain. (3 M) (2019, 2017, 2015)
10. "Cheap and affordable credit is crucial for the country's development." Justify the statement. (3 M or 5 M) (2024, 2023, 2018)
11. Justify the role of 'Self Help Groups' in the rural economy. (3 M or 5 M) (2023, 2022 Term-II)
12. "Bank plays an important role in the economic development of the country." Support the statement with examples. (5 M) (2020, 2019, 2015)
13. "Credit sometimes pushes the borrower into a situation from which recovery is very painful." Support the statement with examples. (5 M) (2020)

Competency Based Questions

14. A shoe manufacturer, M. Salim has to make a payment to the leather supplier and writes a cheque for a specific amount. This means that the shoe manufacturer instructs his bank to pay this amount to the leather supplier. The leather supplier takes this cheque and deposits it in his own account in the bank. The money is transferred from one bank account to another bank account in a couple of days. The transaction is complete without any payment of cash.

- (vi) Propose a marketing strategy that Salim could use to increase demand for his shoes during the off-peak season. (1 M)
- (vii) Evaluate Salim's choice to borrow from the leather supplier and the trader. (1 M)

4. Globalisation

Direction: Questions (1-2) consist of two statements Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. Assertion (A): Globalisation is related to only two or three countries.

Reason (R): MNCs play a major role in the globalisation process. (1 M)

2. Assertion (A): Rapid improvement in technology has been one main factor that has stimulated the globalisation process.

Reason (R): Developing countries are to become at par with developed countries in terms of technological growth due to globalisation. (1 M)

3. Assertion (A): Globalisation leads to increased competition in international and domestic markets.

Reason (R): Globalisation also makes the consumer better off as they have a wider variety of goods to choose from at higher prices. (1 M)

4. Find the odd one out. (1 M)

- (a) Liberalisation (b) Privatisation
(c) Globalisation (d) Authorisation

5. Evaluate the impacts of opening foreign trade on the global economy by identifying the appropriate statements among the following options: (1 M) (CBSE SQP, 2023)

- (i) The choice of goods in the markets increases.
- (ii) Producers from two countries closely compete against each other despite the distance between their locations.
- (iii) Foreign trade thus results in connecting the markets or integration of markets in different countries.
- (iv) The quality of the product is always good.
- (a) Statements (i) and (ii) are appropriate.
- (b) Statements (i), (ii) and (iii) are appropriate.
- (c) All the statements are appropriate.
- (d) Only statement (iv) is appropriate.

Analyze the cheque details and identify what the numbers at the bottom of the cheque primarily represent. (1 M)

- (a) The amount of money to be transferred
- (b) A unique identifier for the cheque itself
- (c) The account number of the payer
- (d) Coding used by banks for processing

6. Two families in a village—one wealthy and the other of modest means—both need to borrow money for agricultural activities. The wealthier family easily secures a loan from a formal banking institution, while the poorer family struggles to find a reliable lender and ends up borrowing from an informal source with higher interest rates. Analyze the reasons behind the disparity in access to formal sector credit between these two families. (3 M)

7. Read the following paragraph and answer the questions.
Festival Season

It is festival season two months from now and the shoe manufacturer, Salim, has received an order from a large trader in town for 3,000 pairs of shoes to be delivered in a month time. To complete production on time, Salim has to hire a few more workers for stitching and pasting work. He has to purchase the raw materials. To meet these expenses, Salim obtains loans from two sources. First, he asks the leather supplier to supply leather now and promises to pay him later. Second, he obtains loan in cash from the large trader as advance payment for 1000 pairs of shoes with a promise to deliver the whole order by the end of the month. At the end of the month, Salim is able to deliver the order, make a good profit, and repay the money that he had borrowed.



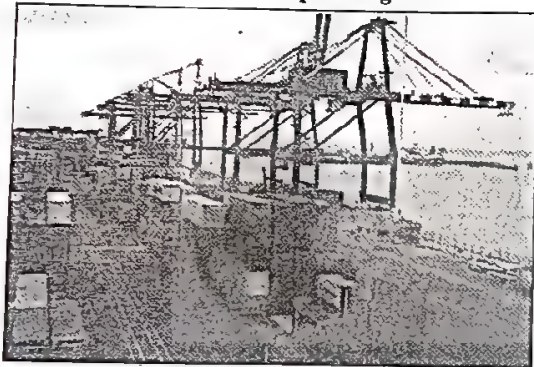
- (i) Considering Salim's strategy to manage production and financial needs, discuss an alternative approach he could have used to secure resources without borrowing. (1 M)

6. Why had the Indian government put barriers to foreign trade and foreign investments after independence? Analyse the reasons. (1 M or 3 M) (2016, 2015)
7. 'Improvement in technology has stimulated the globalisation process.' Explain the statement with examples. (5 M) (2024, 2022 Term-II)
8. Examine five factors to promote the process of globalisation. (5 M) (2024)
9. 'Among producers and workers, the impact of globalisation has not been uniform.' Support the statement with suitable arguments. (5 M) (2023, 2022 Term-II, 2016)
10. Why do multinational corporations (MNCs) set up their offices and factories in certain areas only? Explain any five reasons. (5 M) (2019, 2016)

Competency Based Questions

11. Based on the image provided, which of the following statements best describes the impact of containerisation on global trade? (1 M)

Containers for transport of goods



- (a) Containers have increased the costs of goods globally due to higher transportation fees.
 - (b) Containerization has no significant impact on the speed or cost of transporting goods.
 - (c) Containers have decreased the need for manual labor in ports, increasing the efficiency of loading and unloading goods.
 - (d) The use of containers has slowed down the process of exporting goods to international markets.
12. Imagine a local smartphone manufacturing company in India, "TechBharat," which produces and sells smartphones within the Indian market only. On the other

hand, consider Samsung, a multinational corporation that designs, manufactures, and sells smartphones globally. Discuss the role of globalisation in shaping the strategies of multinational corporations like Samsung compared to domestic companies like TechBharat. (3 M)

13. Read the following paragraph and answer the questions. In the global studies class at Central High School, students are engaging in a group project to understand the historical and modern impacts of globalization. The teacher, Mr. Thompson, introduces the concept by discussing how ancient trade routes, like the Silk Road, initiated the early stages of globalization by connecting diverse civilizations. He explains how these connections allowed for the exchange of goods, ideas, and technologies, highlighting the development of new technologies such as the magnetic compass and advancements in transportation that further propelled the exchange.



As part of the lesson, Mr. Thompson discusses the Information Age, pointing out how modern technology has shrunk distances and increased the speed and volume of global interactions. The class is then asked to reflect on how these historical and contemporary forms of globalization have shaped the world today.

- (i) What key invention during the Silk Road era greatly facilitated the exchange and trade of goods across continents? (1 M)
- (ii) How did the Information Age accelerate the process of globalization according to the scenario described? (1 M)
- (iii) Considering the historical advancements from the Silk Road to the Information Age, analyze how these developments have impacted global economic interdependencies. (2 M)

1. Power-Sharing

Direction: Questions (1-2) consist of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. Assertion (A): Sri Lanka adopted 'Tamil' as the official language of the State.

Reason (R): The Government of Sri Lanka adopted a series of majoritarian measures. (1 M) (2023)

2. Assertion (A): Power sharing can help to prevent conflict in society.

Reason (R): Power sharing ensures that different social groups are included in decision-making processes, reducing marginalisation and fostering inclusivity. (1 M) (CBSE APQ 2023)

3. Consider the following statements on Power Sharing and choose the correct option: (1 M) (2023)

- (I) Majoritarianism is the real spirit of democracy.
- (II) It creates balance and harmony in different groups.
- (III) It reduces the possibility of conflict among social groups.

(IV) Power sharing is the essence of democracy

- (a) I, II and III
- (b) II, III and IV
- (c) I, III and IV
- (d) I, II and IV

4. Which of the following was the primary objective of Belgium to form the separate government in Brussels? (1 M) (2024)

- (a) Promoting cultural events.
- (b) Managing international relations.
- (c) Enforcing local laws.
- (d) Ensuring linguistic accommodation.

5. State any one step taken in Belgium to rule out the problem of regional differences and cultural diversities. (1 M) (2020)

6. Describe the elements of the Belgian model for accommodating diversities. (3 M) (2020)

7. Evaluate the Power-sharing in India. (3 M) (2019)

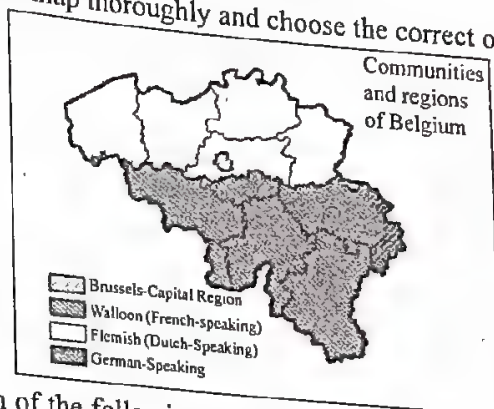
Critical Science

8. How did the idea of power-sharing emerge? Explain different forms that have common arrangements of power sharing. (5 M) (2024, 2023, 2019)

9. How did the feeling of alienation develop among the Sri Lankan Tamils? What were the demands of the Sri Lankan Tamils? (5 M) (2019)

Competency Based Questions

10. Study the map thoroughly and choose the correct option:



Which of the following language are dominantly present in Belgium: (1 M)

- (a) German
- (b) Dutch
- (c) French
- (d) Sinhala

11. Apart from Sri Lanka, another example of majoritarianism is the situation in Nazi Germany under Adolf Hitler's leadership. The Nazi government believed that one group, the Aryan race, was better than others. They thought this group had the right to control everything in politics, society, and the economy. Unfortunately, they didn't care about the rights, dignity, and lives of other groups, especially the Jews. This way of favoring the majority led to a very sad and terrible event called the Holocaust. During this time, around six million Jewish people, along with other minority groups, were persecuted and killed by the government.

(i) What can we learn from the Holocaust about majoritarianism? (2 M)

(ii) Suggest ways to prevent such cruelty and suppression of rights in the future. (1 M)

12. Read the passage and answer the questions that follow:

The U.S. government, during the Jim Crow era largely influenced by the beliefs of the white majority, enacted laws that were discriminatory against African Americans and other minority groups. These laws enforced racial segregation and denied African Americans basic civil rights, under the guise of "separate but equal" status, which in practice was profoundly unequal and oppressive.

This contributed to widespread racial injustices and significantly impacted the lives of African Americans, suppressing their rights and freedoms purely based on race. This dark chapter highlights the dangers of majoritarian rule.

- ## 2. Federalism

(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

- Reason (R):** These States come together on their own to form a bigger unit, so that by pooling sovereignty and retaining identity, they can increase their security. (1 M)

- Reason (R):** Such amendments require a simple Parliament process as they are essential for the dynamic federal governance of India. (1 M)

- (a) India (b) USA
(c) Belgium (d) Spain

- (I) Hindi was identified as the official language.

- (III) English can be used along with Hindi for official purposes.

(a) (I) and (III) (b) (I) and (II)
(c) Only (I) (d) (I), (II) and (III)

- ### Competency Based Questions

- Based on Vidushi Joshi's analysis in the International Journal of Advanced Legal Research (IJALR), how do the federal structures of India and the United States differ in terms of power distribution between central and state governments? (2 M)

-
- Federal Political systems**
- The map displays the following countries with federal political systems (shaded grey):
- United States
 - Canada
 - Mexico
 - Germany
 - France
 - United Kingdom
 - India
 - Australia
 - South Africa
 - United Arab Emirates
 - Malaysia
 - Indonesia (shown in an inset map)
- Other labeled countries include Belgium, Switzerland, Spain, Algeria, Pakistan, Hungary, Nigeria, Venezuela, Argentina, and Sri Lanka.
- Oceans and Seas labeled: PACIFIC OCEAN, ATLANTIC OCEAN, INDIAN OCEAN.

(a) Identify an exception to the rule that most of the large countries of the world are federations from the map. (1 M)

(b) Which is the largest federal country in the world? (1 M)

14. Read the Following Source and answer the questions that follow:

Panchayati Raj

"We need to give more power to the panchayats to realise the dream of Mahatma Gandhi and the hopes of the makers of our Constitution. Panchayati Raj establishes true democracy. It restores power to the only place where power belongs in a democracy - in the hands of the people. Giving power to panchayats is also a way to reduce corruption and increase administrative efficiency. When people participate in the planning and implementation of developmental schemes, they would naturally exercise greater control over these schemes.

This would eliminate the corrupt middlemen. Thus, Panchayati Raj will strengthen the foundations of our democracy."

(i) How does giving power to Panchayats relate to the vision of Mahatma Gandhi? (1 M)

(ii) Explain the primary objective of giving power to the Panchayats. (1 M)

(iii) How does the establishment of Panchayati Raj contribute to democracy? Explain. (2 M)

3. Gender, Religion and Caste

Direction: Questions (1-2) consist of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

1. Assertion (A): The proportion of women in India's legislative bodies is low compared to other countries.

Reason (R): India has not implemented any measures to improve women's political representation. (1 M)

2. Assertion (A): The gender division of labor is considered natural and unchangeable in most societies.

Reason (R): This division is based on biological differences between men and women. (1 M)

3. Which one of the following countries has the highest representation of women in their National Parliament? (1 M) (2023)

(a) Russia

(b) Australia

(c) Sweden

(d) India

4. Which of the following term refers to the belief in and advocacy for the social, political and economic equality of women? (1 M) (2024)

(a) Patriarchy

(b) Matriarchy

(c) Socialist

(d) Feminists

5. Mention any three features of 'secularism' described in the Indian Constitution. (3 M) (2020)

6. Mention the problem of 'Casteism' in Indian politics. (3 M) (2020)

7. 'Communalism can take various forms in politics'. Explain. (5 M) (2020)

8. Explain reasons for the declining of caste system in India. (3 M) (2016-17)

9. Mention different aspects of life in which women are discriminated or disadvantaged in India. (3 M) (2023, 2020, 2019)

10. "Caste inequalities are still prevalent in India." Examine the statement. (3 M) (2019)

11. Explain the role of castes in Indian politics. (5 M) (2020, 2019, 2015)

12. Define the term secularism. Explain any four features of secularism in India. (5 M) (2020, 2019)

Competency Based Questions

13. Based on the 'time use survey' conducted in six states of our country, which of the following statements is/are correct? (1 M)

| Daily time use (hours: minutes) | | |
|--|-------|-------|
| Activities | Men | Women |
| Income generating work | 6:00 | 2:40 |
| Household and related work | 0:30 | 5:00 |
| Talking, Gossip | 1:25 | 1:20 |
| No work/Leisure | 3:40 | 3:50 |
| Sleep, self-care, reading etc. | 12:25 | 11:10 |
| Source: Government of India, Time Use Survey, 1998-99. | | |

(i) Men spend more time on household and related work compared to women.

(ii) Women spend more time on income-generating work compared to men.

- (iii) Men have less leisure time compared to women.
- (iv) Women spend less time on sleep, self-care, and reading compared to men.
- (a) (i) and (iv) only
- (b) (iii) and (iv)
- (c) (ii), (iii) and (iv) only
- (d) (i), (ii), (iii) and (iv)

14. Shruti noticed that a web search for 'Nurse' mostly showed images of women, while a search for 'Engineer' predominantly displayed men. How do these results reflect societal stereotypes and the division of labor based on gender? (2 M)

15. Read the source given below and answer the questions that follow:

Communalism was and continues to be one of the major challenges to democracy in our country. The makers of our Constitution were aware of this challenge. That is why they chose the model of a secular state. This choice was reflected in several constitutional provisions. There is no official religion in the Indian state. Unlike the status of Buddhism in Sri Lanka, that of Islam in Pakistan, and that of Christianity in England, our Constitution does not give a special status to any religion. The Constitution provides to all individuals and communities the freedom to profess, practice, and propagate any religion, or not to follow any religion.

- (i) What is a secular state? (1 M)
- (ii) What measures have our constitutional framers taken to ensure secularism in our country? (1 M)
- (iii) How has India taken a different path than other nations like Sri Lanka, Pakistan, and England in the context of religion? (2 M)

4. Political Parties

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. **Assertion (A):** Political parties are important in the functioning of democracy.

Reason (R): The media plays an important role in the making of Political parties. (1 M) (2023)

2. **Assertion (A):** It is often said that political parties are facing a crisis.

Reason (R): They are very unpopular and the citizens are indifferent to political parties.

3. Which one of the following countries has two-party system? (1 M) (2024)

- (a) China
- (b) United Kingdom
- (c) India
- (d) Pakistan

4. Which component is not a part of a political party? (1 M) (CBSE, APQ 2023)

- (a) The leaders
- (b) The active members
- (c) The voters
- (d) The followers

5. What is meant by Regional political party? State the condition required to be recognized as a regional political party. (1 + 2 = 3 M) (2019, 2016)

6. What is meant by a 'national political party'? State the conditions required to be recognized as a national political party. (1 + 2 = 3 M) (2016)

7. What is a multi-party system? Why has India adopted a multi-party system? Explain. (3 M) (2016, 2015)

8. Describe the efforts to reform political parties in India. (3 M) (2020, 2017)

9. Analyze the need of Political Parties in the Democracy. (3 M) (2023, 2020, 2016)

10. Describe any five functions of political party in a democracy. (5 M) (2024, 2020, 2018)

11. Examine any five major challenges faced by the political parties in India. (5 M) (2024, 2022, 2016)

12. What is meant by a Political party? Describe the three components of a political party. (5 M) (2016, 2015)

Competency Based Questions

13. A party has won the following percentage of seats in the 4 states where it has contested in the state legislative assembly election.

| State | % of Votes Won | No. of Seats Won |
|---------|----------------|------------------|
| State A | 19 | 10 |
| State B | 16 | 4 |
| State C | 35 | 42 |
| State D | 7 | 1 |

The party has not won any Lok Sabha seats.

- (i) What type of political party will it be classified as? Why? (1 M)
 (ii) Can it be classified as a national party? Justify your answer. (1 M)

14. The anti-defection law was enacted to ensure stability in the government by preventing elected members from frequently switching parties. However, this has led to some unintended consequences during the legislative debates. During a crucial session on environmental policy, several lawmakers found themselves unable to vote according to their conscience or the specific needs of their constituencies because of party whip directives. Given this scenario, what are two possible ill effects of the anti-defection law? Discuss how these effects could impact democratic principles and governance. (3 M)
15. Read the Following Source and answer the questions that follow:

Recent Efforts to Reform Political Parties

The Constitution was amended to prevent elected MLAs and MPs from changing parties. This was done because many elected representatives were indulging in DEFLECTION in order to become ministers or for cash rewards. Now the law says that if any MLA or MP changes parties, he or she will lose the seat in the legislature. This new law 'has helped bring defection down. At the same time, this has made any dissent even more difficult. MPs and MLAs have to 'accept whatever the party-leaders decide. The Supreme Court passed an order to reduce the influence of money and criminals. Now, it is mandatory for every candidate who contests elections to file an affidavit giving details of his property and criminal cases pending against him. The new system has made a lot of information available to the public. But there is no system of checking if the information given by the candidates is true.

- (i) Why was the anti-defection law implemented? (1 M)
 (ii) Discuss the dual impact of the anti-defection law in terms of reducing political defections and its impact on democratic dissent within parties. (1 M)
 (iii) What was the Supreme Court's order regarding candidates contesting elections, and what has been the effect of this order? (2 M)

5. Outcomes of Democracy

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).

- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 (c) (A) is true, but (R) is false.
 (d) (A) is false, but (R) is true.

- Assertion (A):** Democracy is a legitimate government.
Reason (R): Regular, free and fair elections are the spirit of democracy. (1 M) (2020)
- Assertion (A):** A public expression of dissatisfaction with democracy shows the success of the democratic project.
Reason (R): It transform people from the status of subject into that of a citizen. (1 M)
- In a representative democracy, which of the following best describes the role of elected representatives? (1 M) (CBSE, APQ 2023)
 - They have absolute power and authority to make decisions without consulting the public.
 - They are accountable to the public and make decisions on behalf of their constituents.
 - They act as mere figureheads with no real power or influence in the government.
 - They serve lifetime appointments and cannot be removed from office.
- Which type of government is likely to be more acceptable to the people in the world? (1 M) (2023)

| | |
|------------------|----------------|
| (a) Democratic | (b) Military |
| (c) Dictatorship | (d) Theocratic |
- Democracy's ability to generate its own support is itself an outcome that cannot be ignored." Analyse the statement with three examples. (5 M) (2021-22)
- Mention the two conditions that democracy must fulfill in order to achieve a harmonious social life. (3 M) (2021-22)
- Accommodation of social diversity is the key feature of democracy." Explain the statement in the Indian context. (5 M) (2024)
- "Democratic systems are based on political equality." Examine the statement. (5 M) (2024, 2015)
- "Democracy stands much superior to any other forms of government in promoting dignity and freedom of the individual." Support the statement with arguments. (5 M) (2023, 2018, 2017)
- "Democracy produces an accountable, responsive and legitimate government." Support the statement with arguments. (2023, 2019, 2016, 2015)
- How is democracy a better form of government in comparison to dictatorship? Explain (5 M) (2023, 2020, 2019, 2016)

12. "There is overwhelming support for the idea of democracy all over the world." Support the statement.
(5 M) (2017, 2015)

Competency Based Questions

13. Based on the outcomes of democracy, which statement accurately reflects the comparison between democracies and dictatorships regarding social harmony? (1 M)
- (a) Democracies always resolve social conflicts completely.
 - (b) Dictatorships handle social differences better than democracies.
 - (c) Democracies can handle social differences and conflicts better than non-democratic regimes.
 - (d) Social harmony is not affected by the type of government.
14. In the course of researching for a project on political systems, Pranav stumbled upon the concept that democracy involves extensive discussions and deliberations, which often results in decision-making processes being perceived as slow. Curious about this, he asked his professor why democracies prioritize such lengthy discussions. His professor explained that this process, while seemingly slow, actually serves a vital purpose. Explain why the professor might value these prolonged discussions in a democratic setting. (2 M)

15. Read the passage below and answer the questions that follow:

Nannu is a daily wage earner. He lives in Welcome Mazdoor Colony, a slum habitation in East Delhi. He lost his ration card and applied for a duplicate one in January 2004. He made several rounds to the local Food & Civil Supplies office for the next three months. But the clerks and officials would not even look at him, leave alone do his job or bother to tell him the status of his application. Ultimately, he filed an application under the Right to Information Act asking for the daily progress made on his application, names of the officials, who were supposed to act on his application and what action would be taken against these officials for their inaction. Within a week of filing application under the Right to Information Act, he was visited by an inspector from the Food Department, who informed him that the card had been made and he could collect it from the office. When Nannu went to collect his card next day, he was given a very warm treatment by the Food & Supply Officer (FSO), who is the head of a Circle. The FSO offered him tea and requested him to withdraw his application under the Right to Information, since his work had already been done.

- (i) What does Nannu's example show? (1 M)
- (ii) What impact did Nannu's action have on officials? (1 M)
- (iii) How does Nannu's experience illustrate the importance and effectiveness of the Right to Information Act for citizens? (2 M)

1. Resources and Development

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. Assertion (A) : Resources are gifts of nature.

Reason (R): Resources like soil, air, and water are easily available in nature. (1 M)

2. Assertion (A): Resource planning in India is guided by Five-Year Plans.

Reason (R): Five-Year plans outline the objectives, strategies, and allocation of resources for the economic and social development of the country. (1 M)

3. Identify the soil with the help of following information. (2024)

- It develops in areas with high temperature.
 - It is the result of immense leaching due to heavy rain.
 - Humus content is low. (1 M)
- (a) Arid soil (b) Yellow soil
- (c) Laterite soil (d) Black soil

4. How is the issue of sustainability important for development? Explain. (3 M) (2024, 2018)

5. Describe any three main features of 'Alluvial soil' found in India. (3 M) (2019, 2013)

6. Describe any three main features of 'Black soil' found in India. (3 M) (2019, 2013)

Competency Based Questions

7. Read the following statements and choose the correct option:

During a field study in Gujarat, Amit observed the effects of overgrazing on land quality.

Statement-I: Overgrazing can lead to soil compaction, reducing its fertility.

Statement-II: Soil compaction can increase water infiltration. (1 M)

Choose the correct answer:

- (a) Both statements are false.
- (b) Statement-I is true, Statement-II is false.
- (c) Statement-I is false, Statement-II is true.
- (d) Both statements are true.

8. In a small town, agricultural expert Mr. Amit Gupta and environmental planner Mrs. Sunita Rao are working together to draft a resource plan. They aim to enhance the town's development by optimizing the use of local resources such as rivers and fertile land, which have been underutilized due to a lack of technology and infrastructure.

Explain how Mr. Gupta and Mrs. Rao can utilize resource **planning** to improve the agricultural output of the town. Consider the need for appropriate technology and institutional support in your response.

9. Read the following passage and answer the questions that follow:

Soil Management and Conservation in India

India's diverse geography features various soil types, each presenting unique challenges for agriculture and conservation. Red and yellow soils, prevalent in parts of the Deccan plateau and the Piedmont zones of the Western Ghats, are characterized by their iron content which impacts their fertility. Laterite soils, common in tropical southern states, are highly acidic and subject to intense leaching, making them challenging for agriculture without proper management. Arid soils in the western regions, particularly Rajasthan, require innovative irrigation methods due to their high salinity and low moisture content. Forest soils, found in the mountainous and rainforest regions, are typically rich in organic matter but are prone to erosion if not properly managed. These conditions necessitate tailored agricultural practices and conservation efforts to maintain soil health and productivity across different landscapes.

(i) How can mulching be used to improve water retention and reduce soil erosion in red and yellow soils? (1 M)

(ii) Analyze the impact of intensive agriculture on the nutrient depletion of laterite soils and propose a sustainable farming practice to mitigate this issue. (1 M)

(iii) Design a soil conservation plan for arid soils in Rajasthan that integrates both traditional and modern irrigation techniques to enhance soil productivity. (2 M)

2. Forest and Wildlife Resources

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. **Assertion (A):** India is one of the world's richest countries in terms of its vast array of biological diversity.

Reason (R): India has a diverse range of ecosystems, including forests, grasslands, wetlands, and coastal areas that support a wide variety of flora and fauna. (1 M)

2. **Assertion (A):** Forests do not play a key role in the ecological system, as they are also the primary producers on which all other living beings depend.

Reason (R): Forests provide shelter for animals and regulate the earth's temperature. (1 M)

3. Why are diverse flora and fauna important for human lives? (1 M)

- (a) They provide food, water, and air quality regulation.
- (b) They provide entertainment for humans.
- (c) They are important for scientific research.
- (d) They have no direct impact on human lives.

4. How have human activities affected the depletion of flora and fauna? (1 M)

- (a) By over-harvesting resources, such as timber and wildlife.
- (b) By polluting the environment with chemicals and waste.
- (c) By destroying natural habitats through deforestation and urbanization.
- (d) All of the above

5. Suggest any two measures for the conservation of forest. (2 M) (2024)

6. Suggest any two measures for the conservation of wildlife. (2 M) (2024)

Competency Based Questions

7. In a national quiz competition for students, you are presented with a challenge to match different types of forests in India to their unique characteristics based on their management and conservation importance. Use your

understanding of the forest categorizations to align forest type with the correct description

| Column-I | | Column-II | |
|----------|-------------------|-----------|---|
| (A) | Reserved Forests | (i) | Managed by local communities and includes forests and wastelands owned by government and private individuals. |
| (B) | Protected Forests | (ii) | Reserved and protected forests maintained for the purpose of producing timber and other forest produce, and for protective reasons. |
| (C) | Unclassed Forests | (iii) | Protected from any further depletion and significant in states like Bihar, Haryana, and Punjab. |
| (D) | Permanent Forests | (iv) | Considered most valuable for conservation, encompassing more than half of the forest land. |

- (a) A-(ii), B-(i), C-(iv), D-(iii)
- (b) A-(i), B-(ii), C-(iv), D-(iii)
- (c) A-(iii), B-(iv), C-(ii), D-(i)
- (d) A-(iv), B-(iii), C-(i), D-(ii)

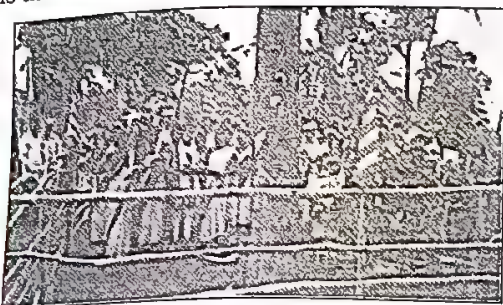
8. You are a conservationist working with a tribal community in the Sariska Tiger Reserve. The community has noticed a significant decrease in the tiger population and an increase in illegal logging activities. As a conservationist, create a plan to protect the tiger population and to prevent further deforestation & illegal logging activities in the Sariska Tiger Reserve. (5 M)

9. Read the source given below and answer the following question:

Sacred groves - a wealth of diverse and rare species

Nature worship is an age-old tribal belief based on the premise that all creations of nature have to be protected. Such beliefs have preserved several virgin forests in pristine form called Sacred Groves (the forests of God and Goddesses). These patches of forest or parts of large forests have been left untouched by the local people and any interference with them is banned. Certain societies revere a particular tree which they have preserved from time immemorial. The Mundas and the Santhals of Chota Nagpur region worship mahua (*Bassia latifolia*) and kadamba (*Anthocaphalus cadamba*) trees, and the tribals of Odisha and Bihar worship the tamarind (*Tamarindus indica*) and

mango (*Mangifera indica*) trees during weddings. To many of us, peepal and banyan trees are considered sacred. Indian society comprises several cultures, each with its own set of traditional methods of conserving nature and its creations. Sacred qualities are often ascribed to springs, mountain peaks, plants and animals which are closely protected. You will find troops of macaques and langurs around many temples. They are fed daily and treated as a part of temple devotees. In and around Bishnoi villages in Rajasthan, herds of blackbuck, (chinkara), nilgai and peacocks can be seen as an integral part of the community and nobody harms them.



- Propose a community-based conservation project for your locality that incorporates elements from the concept of Sacred Groves. Highlight how you would involve different community members and integrate local cultural practices. (1 M)
- Describe how Sacred Groves are important for the preservation of species. Provide examples of how specific communities have used Sacred Groves to protect their local flora and fauna. (1 M)
- Assess the impact of sacred groves on local wildlife populations, using examples of fauna, such as macaques, langurs, and blackbucks. (2 M)

3. Water Resources

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).
- Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (A) is true, but (R) is false.
- (A) is false, but (R) is true.

1. **Assertion (A):** Water scarcity is a significant issue in both arid and non-arid regions around the world.

Reason (R): Unequal access to water and overuse in agriculture and industry contribute to water scarcity even in areas with sufficient rainfall. (1 M)

2. **Assertion (A):** Growing population is the main reason for water scarcity.

Reason (R): Irrigation from tube wells and canals is responsible for water scarcity. (1 M)

3. Match the Column-I with Column-II and choose the correct option: (1 M)

| Column-I (River) | | Column-II (Dam) | |
|------------------|----------|-----------------|-------------------|
| (A) | Mahanadi | (i) | Sardar Sarovar |
| (B) | Narmada | (ii) | Hirakud |
| (C) | Chambal | (iii) | Salal |
| (D) | Chenab | (iv) | Rana Pratap Sagar |

- A-IV, B-III, C-II, D-I
 - A-III, B-IV, C-I, D-II
 - A-II, B-I, C-IV, D-III
 - A-I, B-II, C-III, D-IV
4. Explain any three causes of water scarcity. (3 M) (2015 Term-I)
5. "Water scarcity may be an outcome of large and growing population in India." Analyse the statement. (3 M) (2019)
6. Discuss how rainwater harvesting in semi-arid regions of Rajasthan are carried out. (5 M)

Competency Based Questions

7. In the fictional town of Greenfield, an emerging urban center that has recently attracted several large industrial plants and is also developing a hydroelectric power station on the nearby river. The local government is considering the introduction of a new water management plan in response to concerns about water scarcity affecting the community and ecological balance.

Identify which of the following statements are true regarding the impact of industrialization and urbanization on water resources: (1 M)

Statement-I: Industrial units consume significant amounts of water, contributing to water scarcity.

Statement-II: All urban centers are self-sufficient in meeting their water needs.

Statement-III: Hydroelectric power, accounting for 22% of India's electricity, intensifies water demand.

Statement-IV: Jal Jeevan Mission aims to provide limited water access to urban households only.

- Statement-I & Statement-II are correct
- Statement-I & Statement-III are correct
- Statement-I & Statement-IV are correct
- Statement-I, II & III are correct

8. In Shillong, a city known for its heavy rainfall, residents are surprisingly facing water shortages. As a geography consultant for the city council, you have been asked to propose a sustainable solution to address this paradox. Which of the following strategies would you recommend to ensure a steady supply of water throughout the year, especially during dry periods? (1 M)

- Implement flood control measures to prevent water runoff.
- Establish rooftop rainwater harvesting systems to collect and store rainwater.
- Introduce soil erosion control programs to preserve water quality.
- Develop groundwater recharge projects to increase water table levels.

9. Read the source given below and answer the following questions:

Bamboo Drip Irrigation System

In Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes, is prevalent. About 18-20 litres of water enters the bamboo pipe system, gets transported over hundreds of metres, and finally reduces to 20-80 drops per minute at the site of the plant.

Fig. 1: Bamboo pipes are used to divert perennial springs on the hilltops to the lower reaches by gravity.

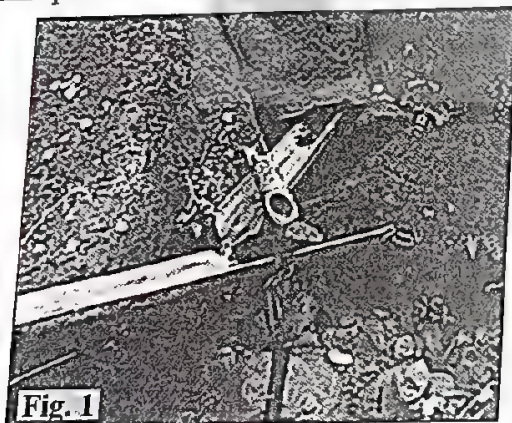


Fig. 1

Fig. 2 and 3: The channel sections, made of bamboo, divert water to the plant site where it is distributed into branches, again made and laid out with different forms of bamboo pipes. The flow of water into the pipes is controlled by manipulating the pipe positions.

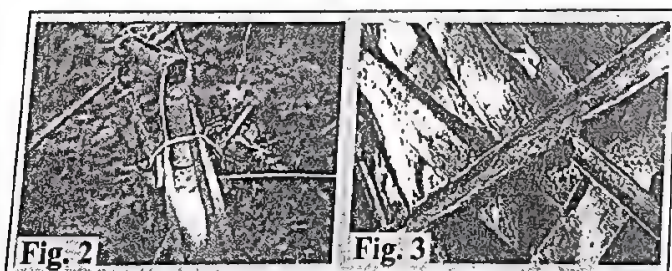


Fig. 2

Fig. 3

Fig. 4: If the pipes pass a road, they are taken high above the land.

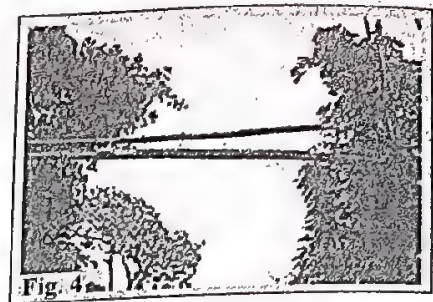


Fig. 4

Fig. 5 and 6: Reduced channel sections and diversion units are used at the last stage of water application. The last channel section enables water to be dropped near the roots of the plant.

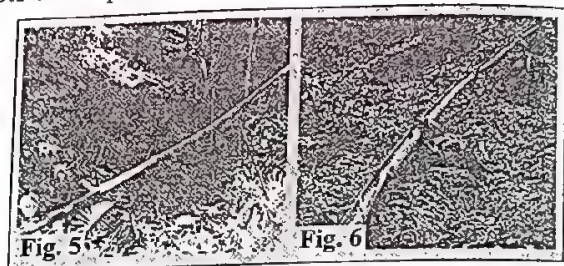


Fig. 5

Fig. 6

- Evaluate the sustainability of the bamboo drip irrigation system in the context of modern agricultural demands. How does it stand up to the needs for large-scale agricultural operations? (1 M)
- Examine how the traditional bamboo drip irrigation system could be adapted for use in other hilly regions of India. (1 M)
- Analyze the impact of the bamboo drip irrigation system on the local ecosystem in Meghalaya. What are the possible positive and negative impacts? (1 M)

4. Agriculture

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).
- Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (A) is true, but (R) is false.
- (A) is false, but (R) is true.

1. **Assertion (A):** Indian farmers should diversify their cropping patterns from cereals to high-value crops.

Reason (R): This will increase income and reduce environmental degradation simultaneously. (1 M)

Assertion (A): The Green Revolution had a significant impact on Indian agriculture.
Reason (R): The Green Revolution involved the introduction of high-yielding varieties of crops, improved irrigation facilities, and increased use of fertilizers and pesticides.

3. Read the given statements and choose the correct option with regard to Rabi cropping season from the following: (1 M)

(i) Rabi crops are sown in winter.

(ii) Sown from October to December and harvested From April to June.

(iii) Important crops are maize, cotton, and jute.

(iv) Punjab, Haryana, and Uttar Pradesh are important for the production of wheat.

(a) I, III and IV (b) II, III and IV
 (c) I, II and IV (d) I, II and III

4. Identify the crop with the help of the following information and choose the correct option. (1 M)

(i) This is the staple food crop.

(ii) This is a Kharif crop.

(iii) It requires high temperature and high humidity.

(iv) It requires above 100 cm of annual rainfall.

(a) Wheat (b) Maize
 (c) Rice (d) Jwar

5. Give one example of the commercial crops cultivable in laterite soil. (2 M) (2020, 2015)

6. "Agriculture and industry move hand in hand." Support the statement with examples. (2 M) (2023, 2013, 2012)

7. Write the amount of annual rainfall required for the cultivation of Wheat. (2 M) (2020, 2011)

8. Name one important beverage crop and specify the geographical conditions required for its growth. (2 M)

9. Explain any three factors responsible for soil formation. (3 M) (2012, 2011)

10. Describe any three main features of "Rabi crop season". (3 M) (2019)

11. Describe any three main features of "Kharif crop season". (3 M) (2019)

12. Explain the features of Commercial Farming. (5 M) (2024, 2019, 2015, 2011)

13. Explain the features of Primitive Subsistence Farming. (5 M) (2024, 2019, 2015, 2011)

14. Compare 'intensive subsistence farming' with that of 'commercial farming' practiced in India. (5 M) (2019, 2018)

15. Name the two major beverage crops grown in India. Describe their growing areas. (5 M) (2019, 2015)

Competency Based Questions

16. During a national-level debate competition, Nisha, representing her school, is presented with statements about India's cropping seasons. She needs to argue which statement is accurate, particularly focusing on the impact of Western temperate cyclones and the timing of crop harvesting. (1 M)

Statement-I: Rabi crops are harvested during the monsoon season.

Statement-II: Western temperate cyclones facilitate rabi cropping in Northern India.

Statement-III: The green revolution had a negligible impact on rabi crops.

Statement-IV: Wheat and barley are important kharif crops.

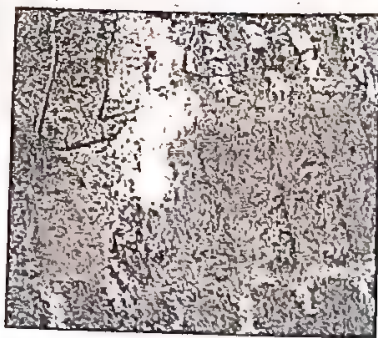
(a) Only Statement-I is correct
 (b) Only Statement-II is correct
 (c) Statement-II & Statement-III are correct
 (d) None of these

17. Agricultural officer, Ms. Sharma, is assigned to assist farmers in the semi-arid region of Marathwada, Maharashtra, where rainfall is scarce but sugarcane is a major crop. She is planning a workshop to educate local farmers about optimizing sugarcane cultivation under their specific climatic conditions. Describe those specific climatic conditions necessary for sugarcane production. (2 M)

18. Read the source given below and answer the following questions:

Jhumming agriculture

The 'slash and burn' agriculture is known as 'Milpa' in Mexico and Central America, 'Conuco' in Venezuela, 'Roca' in Brazil, 'Masole' in Central Africa, 'Ladang' in Indonesia, 'Ray' in Vietnam. In India, this primitive form of cultivation is called 'Bewar' or 'Dahiya' in Madhya Pradesh, 'Podu' or 'Penda' in Andhra Pradesh, 'Pama Dabi' or 'Koman' or Bringa' in Odisha, 'Kumari' in Western Ghats, 'Valre' or 'Waltre' in South-eastern Rajasthan, 'Khil' in the Himalayan belt, 'Kuruwa' in Jharkhand, and 'Jhumming' in the North-eastern region. Rinjha lived with her family in a small village at the outskirts of Diphu in Assam. She enjoys watching her family members clearing, slashing and burning a patch of land for cultivation. She often helps them in irrigating the fields with water running through a bamboo canal from the nearby spring. She loves the surroundings and wants to stay here as long as she can, but this little girl has no idea about the declining fertility of the soil and her family's search for a fresh patch of land in the next season.



- (i) Compare the names and regions of 'slash and burn' agriculture practices in India and the two other countries mentioned. (1 M)
- (ii) Propose an alternative sustainable farming method that could be introduced to Rinjha's community to address the issue of declining soil fertility. (1 M)
- (iii) How can the practice of 'slash and burn' agriculture affect the long-term sustainability of the environment? Provide an example from the paragraph. (2 M)

5. Minerals and Energy Resources

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. **Assertion (A):** Bauxite is an important mineral used for the production of aluminium.

Reason (R): India has large reserves of bauxite, which are mainly found in Odisha, Andhra Pradesh, and Gujarat.

(1 M)

2. **Assertion (A):** Metallic minerals are extensively used in various industries, including construction, manufacturing, and electronics.

Reason (R): Metallic minerals possess properties like strength, malleability, and conductivity, making them suitable for industrial applications.

(1 M)

3. Suggest any two ways to conserve energy resources in India. (2 M)

Competency Based Questions

4. In a geography project, students are studying the mineral resources of north-east India. They discover that in this

region, unlike the rest of the country, minerals are often owned by individuals or communities. This unique ownership has led to mining practices like 'Rat-hole' mining in Meghalaya. The students also learn about the legal actions taken by the National Green Tribunal against these practices due to environmental concerns. (1 M)

Statement-I: In north-east India, particularly in Meghalaya, minerals are owned by individuals or communities rather than being nationalized.

Statement-II: The National Green Tribunal has declared 'Rat-hole' mining in Meghalaya illegal due to environmental concerns.

Choose the correct answer:

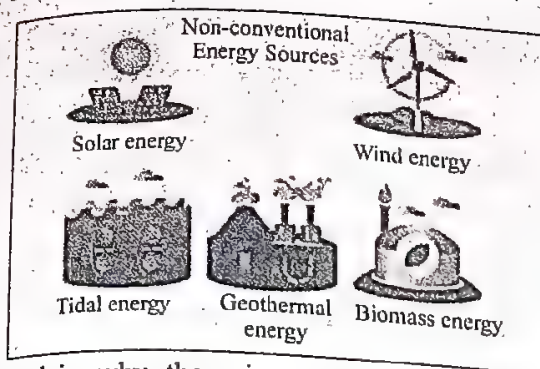
- (a) Both statements are false.
- (b) Statement I is true, Statement II is false.
- (c) Statement I is false, Statement II is true.
- (d) Both statements are true.

5. The Steel Authority of India Limited (SAIL) is considering expanding its operations to include a new iron ore processing plant. As part of the feasibility study, the board needs to understand the differences between the two main types of iron ore, their properties, and their specific uses in the steelmaking process. As a consultant for SAIL, prepare a detailed report comparing the two main types of iron ore, highlighting their differences and uses. (3 M)

6. Read the source given below and answer the following questions:

Non-Conventional Sources of Energy

Non-Conventional Sources of Energy The growing consumption of energy has resulted in the country becoming increasingly dependent on fossil fuels such as coal, oil and gas. Rising prices of oil and gas and their potential shortages have raised uncertainties about the security of energy supply in future, which in turn has serious repercussions on the growth of the national economy. Moreover, the increasing use of fossil fuels also causes serious environmental problems. Hence, there is a pressing need to use renewable energy sources like solar energy, wind, tide, biomass and energy from waste material. These are called non-conventional energy sources. India is blessed with an abundance of sunlight, water, wind and biomass. It has the largest programmes for the development of these renewable energy resources. Nuclear or Atomic Energy is obtained by altering the structure of atoms. When such an alteration is made, much energy is released in the form of heat and this is used to generate electric power. Uranium and Thorium, which are available in Jharkhand and the Aravalli ranges of Rajasthan are used for generating atomic or nuclear power. The Monazite sands of Kerala is also rich in Thorium.



- (i) Explain why there is a growing need for non-conventional energy sources in India. (1 M)
- (ii) Analyze how India's geographical advantages contribute to its development of non-conventional energy sources. (1 M)
- (iii) Identify the six nuclear power stations in India and discuss the challenges these facilities face concerning location and resource management. (2 M)

6. Manufacturing Industries

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. Assertion (A): Industrial pollution is the main cause of environmental degradation.

Reason (R): Industries release harmful pollutants into the air, water, and soil, which can have negative impacts on human health and the environment. (1 M)

2. Assertion (A): India is the largest producer of raw jute and jute goods.

Reason (R): Most jute mills in India are located along the banks of the Hugli River. (1 M)

3. How is cement industry responsible for land degradation? (1 M or 2 M) (2019)

4. Classify industries on the basis of raw materials. (2 M) (2022 Term-II, 2016 Term-II)

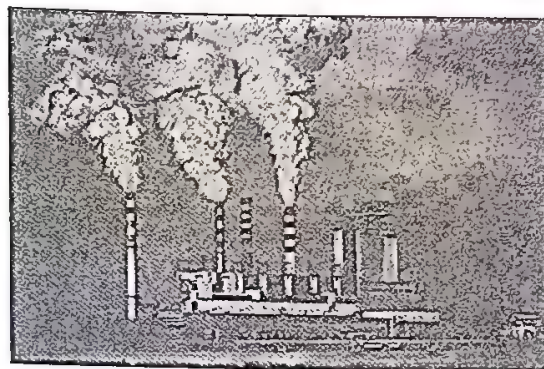
5. "Efficient means of transport are pre-requisites for fast development of the country." Support the statement with examples. (3 M) (2020, 2016 Term-II)

6. "The textile industry is the only industry in the country which is self-reliant and complete in the value chain." Justify the statement. (3 M) (2016 Term-II)

- 7. How can the industrial pollution of fresh water be reduced? Explain with examples.** (5 M) (2013, 2020, 2019)
- 8. Explain the factors which are responsible for location of industries.** (5 M) (2020, 2015, 2012, 2011)
- 9. How can the industrial pollution of fresh water be reduced? Explain with examples.** (5 M) (2023, 2020, 2019)

Competency Based Questions

- 10. Meena, an environmental scientist, is designing a community workshop to educate the public about the effects of thermal pollution caused by local thermal power plants.**



What aspect of thermal pollution should Meena emphasize to illustrate its impact on aquatic life? (1 M)

- (a) The role of thermal pollution in increasing river temperatures and decreasing oxygen levels in water.
- (b) The increase in noise pollution due to thermal power generation.
- (c) The direct effects of thermal pollution on soil fertility.
- (d) The contribution of thermal pollution to air quality degradation.

11. Arjun is the community leader in Technoville, his aim is to diversify the city's iron and steel-based industrial base by introducing chemical and fertilizer industries. This strategic shift considers global market dynamics, environmental impacts, and local skilled labor availability. Assess the decision's implications for employment, environmental sustainability, and industrial integration.

Consider the impact of introducing chemical and fertilizer industries in Technoville on local employment, environmental sustainability, and integration with existing industries. (2 M)

12. Read the following passage carefully and answer the questions that follow:

Indore and Kanpur is the industrial city, known for its steel production, concerns over environmental degradation have grown significantly due to the emissions from

various factories. In response, a local environmental NGO has initiated a collaborative project with the steel plants to implement green technologies and pollution control measures. The project aims to reduce air and water pollution by introducing advanced filtration systems, promoting the reuse of industrial waste, and developing community awareness programs about environmental sustainability. This initiative has started to show positive results, with noticeable improvements in local air and water quality. The community is also actively participating in various environmental conservation activities encouraged by the NGO.

- (i) Evaluate how the introduction of green technologies in Indore's steel plants could potentially alter the local environmental quality. (1 M)
- (ii) Analyze the role of community involvement in enhancing the effectiveness of environmental sustainability programs in Indore. (1 M)
- (iii) Discuss the potential long-term economic benefits that Indore might experience from integrating environmental conservation practices in its industrial operations. (2 M)

1. The Rise of Nationalism in Europe

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).
- Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (A) is true, but (R) is false.
- (A) is false, but (R) is true.

1. Assertion (A): In Britain, the formation of the nation-state was not the result of a sudden upheaval.

Reason (R): Ethnic groups in Britain extended its influence. (1 M) (2022 Term-I)

Assertion (A): Weavers in Silesia led a revolt against contractors in 1845.

Reason (R): Contractors had drastically reduced their payments. (1 M) (2022 Term-I)

3. Which one of the following groups of countries collectively defeated Napoleon in 1815? (1 M) (2022 Term-I)

- Britain, Russia, Prussia and Austria
- Britain, Russia, Prussia and Australia
- Britain, Russia, Netherlands and Germany
- Britain, Luxembourg, Germany and Italy

4. Who among the following remarked "When France sneezes, the rest of Europe catches cold"?

(1 M) (2022 Term-I, 2020, 2016 Term-II)

- Lord Byron
- Metternich
- Johann Herder
- Napoleon

5. How did the 'Treaty of Constantinople' of 1832 recognise Greece as an independent nation? Explain.

(2 M) (2023, 2016 Term-II)

6. How had the female figures become an allegory of the nation during nineteenth century in Europe? Analyse. (2016 D)

7. Describe the great economic hardship that prevailed in Europe during the 1830s. (3 M) (2019, 2016 Term-II)

8. How had Napoleonic code exported to the regions under French control? Explain with examples.

(3 M) (2019, 2017)

9. Analyse the process of German Unification.

(3 M) (2024, 2015 Term-II)

10. Analyse the measures and practices introduced by the French revolutionaries to create a sense of collective identity amongst the French people.

(5 M) (2017, 2016 Term-II, 2015 Term-II)

11. How did the ideology of 'liberalism' affect the Europe in early nineteenth century? Explain.

(5 M) (2024, 2023, 2020)

Competency Based Questions

12. Ravi is a student focused on art and symbolism, analyzing a painting depicting Christ, saints, and angels watching over a procession of nations. In the painting where Christ, saints, and angels oversee a procession of people from various nations, what do these celestial figures symbolize about the relationship between these nations?



- Friendship among the nations
- Fraternity among the nations
- Love among the nations
- Freedom of the nations

13. Given below is the painting 'Imperial Federation - Map of the World showing the extent of the British Empire in 1886'. Observe the painting and answer the question that follows.



Which of the following elements depicted in the painting seem conflicting when presented together?

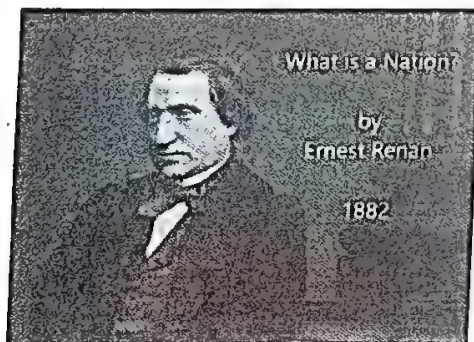
- the British soldiers and British colonies spread in both east and west

- (b) the variety of animals and costumed figures depicting countries and their people
- (c) Britannia, the personification of Britain, seated on top of the world and the words federation written at the top of the image
- (d) The words 'freedom' and 'fraternity' written at the top and Atlas, depicting human labour, holding the world upon his shoulders

14. Read the following source carefully and answer the questions that follow:

Ernst Renan, 'What is a Nation?'

In a lecture delivered at the University of Sorbonne in 1882, the French philosopher Ernst Renan (1823-92) outlined his understanding of what makes a nation. The lecture was subsequently published as a famous essay entitled 'Qu'est-ce qu'une nation?' ('What is a Nation?'). In this essay Renan criticises the notion suggested by others that a nation is formed by a common language, race, religion, or territory: 'A nation is the culmination of a long past of endeavours, sacrifice and devotion. A heroic past, great men, glory, that is the social capital upon which one bases a national idea. To have common glories in the past, to have a common will in the present, to have performed great deeds together, to wish to perform still more, these are the essential conditions of being a people. A nation is therefore a large-scale solidarity ... Its existence is a daily plebiscite ... A province is its inhabitants; if anyone has the right to be consulted, it is the inhabitant. A nation never has any real interest in annexing or holding on to a country against its will. The existence of nations is a good thing, a necessity even. Their existence is a guarantee of liberty, which would be lost if the world had only one law and only one master.'



- (i) Relate Renan's concept of 'daily plebiscite' to modern democratic practices in any contemporary society. How do daily decisions by the public embody this idea?
- (ii) Analyze how Renan's rejection of common language, race, religion, or territory as the basis for nationhood challenges the traditional notion of a nation-state.

- (iii) Imagine a scenario where Renan's ideas are implemented in a multinational state today. Propose a policy that could enhance national solidarity while respecting diverse ethnic identities within the state.

2. Nationalism in India

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

1. **Assertion (A):** The peasant movement in Awadh during the Non-Cooperation Movement adopted violent methods to protest against oppressive landlords.

Reason (R): The peasant movement demanded reduction of revenue, abolition of begar, and social boycott of oppressive landlords. (1 M)

2. **Assertion (A):** Mahatma Gandhi saw the Khilafat issue as an opportunity to bring Hindus and Muslims closer together in the national movement.

Reason (R): The Khilafat issue does not involved defending the temporal powers of the Ottoman emperor, which resonated with the Muslim community in India. (1 M)

3. Certain events are given below. Choose the appropriate chronological order: (1 M) (2020)

- (I) Coming of Simon Commission to India.
- (II) Demand of Purna Swaraj in Lahore Session of INC.
- (III) Government of India Act, 1919.
- (IV) Champaran Satyagraha.

Choose the correct option:

- (a) (III)-(II)-(IV)-(I) (b) (I)-(II)-(IV)-(III)
- (c) (II)-(III)-(I)-(IV) (d) (IV)-(III)-(I)-(II)

4. The Indian masses willingly participated in the Civil Disobedience Movement, despite the challenges faced during the Non-Cooperation Movement. Accordingly, which of the following quotes BEST reflects the outlook of the masses? (1 M) (2023)

- (a) 'The greatest glory in living lies not in never falling, but in rising every time we fall'
- (b) 'An eye for an eye only ends up making the whole world blind'
- (c) 'Injustice anywhere is a threat to justice everywhere'
- (d) 'Obedience is the key to a peaceful society'

Mention any two causes that led to the Civil Disobedience Movement. (2 M) (2024, 2023, 2022 Term-II)

Why did Mahatma Gandhi decide to withdraw the Non-Cooperation Movement in February 1922? Explain. (3 M) (2022 Term-II, 2017)

How did the First World War create a new economic situation in India? Explain. (3 M) (2022 Term-II, 2020, 2019)

Why did Mahatma Gandhi decide to launch a nationwide Satyagraha against the proposed Rowlatt Act 1919? Explain any three reasons. (3 M) (2017, 2016 Term-II, 2015 Term-II)

How were the various social groups involved in the Civil Disobedience Movement? Explain with examples. (5 M) (2024, 2023, 2016 Term-II)

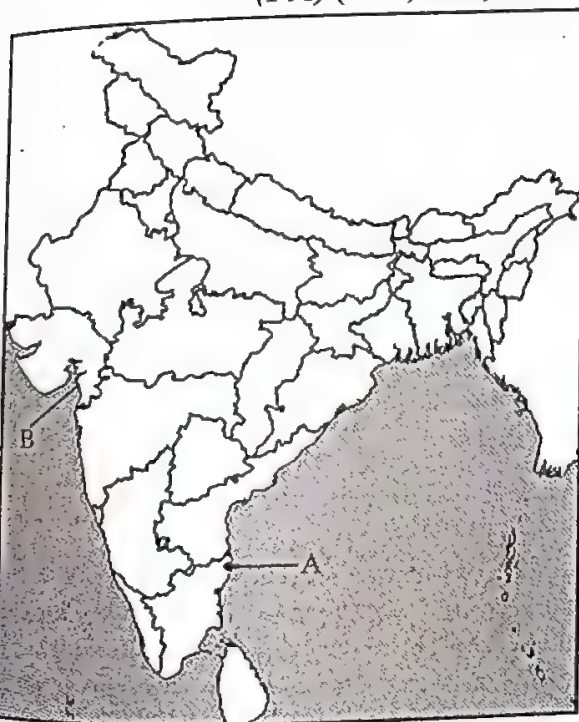
Plantation workers had their own understanding of Mahatma Gandhi's ideas and the notion of 'Swaraj'." Support the statement. (5 M) (2017, 2016 Term-II)

Why was the Salt March considered an effective symbol of resistance against colonialism? Explain. (5 M) (2018, 2015 Term-II)

Two places (A) and (B) have been marked on the given political outline map of India. Identify them with the help of given information and write their correct names on the lines drawn near them.

(A) The place where Indian National Congress Session was held in 1927. (1 M) (2024, 2023, 2015 Term-I, 2015 Term-II)

(B) The place where Mahatma Gandhi broke Salt law. (1 M) (2024, 2023, 2019, 2017)



Competency Based Questions

13. The Indian masses willingly participated in the Civil Disobedience Movement despite the challenges faced during the Non-Cooperation Movement. Which of the following quotes BEST reflects the outlook of the masses?
- 'The greatest glory in living lies not in never falling, but in rising every time we fall'
 - 'An eye for an eye only ends up making the whole world blind'
 - 'Injustice anywhere is a threat to justice everywhere'
 - 'Obedience is the key to a peaceful society'

14. During a cultural festival at a school in the early 20th century, students are asked to present projects that depict symbols of Indian nationalism. One student creates a painting of Bharat Mata (Mother India) holding a flag and surrounded by various symbols representing different aspects of Indian culture and resistance against British rule. The painting receives much appreciation and inspires a sense of pride and unity among the students and teachers.

Which of the following elements in the painting of Bharat Mata would MOST LIKELY contribute to fostering a sense of nationalism among the diverse population of India during the freedom struggle?

- It provided a modern, industrialised vision of India.
- It depicted India as a divine and spiritual mother, evoking emotional and cultural unity.
- It represented India as a technological hub.
- It highlighted the economic policies of the colonial government.

15. Read the given source carefully and answer the question that follows.

On 6 January 1921, the police in United Provinces fired at peasants near Rae Bareilly. Jawaharlal Nehru wanted to go to the place of firing, but was stopped by the police. Agitated and angry, Nehru addressed the peasants who gathered around him. This is how he later described the meeting: 'They behaved as brave men, calm and unruffled in the face of danger. I do not know how they felt but I know what my feelings were. For a moment my blood was up, non-violence was almost forgotten – but for a moment only. The thought of the great leader, who by God's goodness has been sent to lead us to victory, came to me, and I saw the kisans seated and standing near me, less excited, more peaceful than I was – and the moment of weakness passed, I spoke to them in all humility on non-violence – I needed the lesson more than they – and they heeded me and peacefully dispersed.'

Quoted in Sarvapalli Gopal, Jawaharlal Nehru: A Biography, Vol. I.

- (i) Why did Jawaharlal Nehru almost forget the principle of non-violence during the incident near Rae Bareilly?
- (ii) How did the peasants behave in the face of police firing, according to Nehru?
- (iii) Describe the influence Mahatma Gandhi had on Jawaharlal Nehru during the incident near Rae Bareilly, as narrated by Nehru.

3. The Making of a Global World

Direction: Questions (1-2) consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

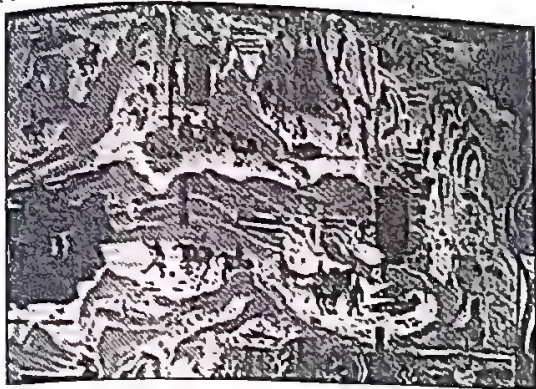
- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
 - (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - (c) (A) is true, but (R) is false.
 - (d) (A) is false, but (R) is true.
1. **Assertion (A):** Until the nineteenth century, poverty and hunger were common in Europe.
Reason (R): Cities were crowded and deadly diseases were widespread. (1 M)
 2. **Assertion (A):** The silk routes were regarded as the most important route linking the distant parts of the world.
Reason (R): Routes existed even before the Christian Era and flourished till the 15th century. (1 M)
 3. How did the global transfer of disease in the pre-modern world help in the colonization of the Americas? (1 M)
 - (a) It weakened the immune systems of Native Americans, making them more susceptible to European diseases
 - (b) It strengthened the immune systems of Native Americans, making them resistant to European diseases
 - (c) It had no impact on the colonization of the Americas
 - (d) None of the above
 4. Which of the following is a good example of pre-modern trade and cultural links between distant parts of the world? (1 M)
 - (a) The Industrial Revolution
 - (b) The Silk Routes
 - (c) The Age of Exploration
 - (d) The Digital Age
 5. Mention any two advantages of the Silk route in the pre-modern trade.
 6. "The new crops could make the difference between life and death". Explain the above statement in context of Irish Potato Famine.

7. 'Even 'ready' foodstuff in distant parts of the world might share common origins.' Justify the statement with a relevant example.
8. "The most powerful weapon of the Spanish conquerors was not a conventional military weapon at all". Justify the above statement by giving two reasons.
9. Why did Europeans flee to America in the 19th century? Explain.

Competency Based Questions

10. Consider the scenario of a merchant traveling along the Silk Routes during the pre-modern era. This merchant engages with various cultures along the way, trading goods like silk and pottery. How these interactions might contribute to the spread of religious ideas and cultural practices, specifically focusing on Buddhism and Christianity.
 - (a) The Silk Routes limited cultural interactions to the exchange of goods such as silk and pottery.
 - (b) The Silk Routes facilitated extensive cultural exchanges, including the spread of religions such as Buddhism and Christianity.
 - (c) Cultural interactions along the Silk Routes were strictly regulated by the governments of the regions involved.
 - (d) The Silk Routes were primarily used for political negotiations between empires, with little cultural exchange.
11. Tracing the origins of common foods reveals the interconnection of different cultures. Which of the following examples best illustrates how global exploration and cultural exchange influenced culinary traditions?
 - (a) Potatoes and tomatoes, originally from the Americas, became staples in European diets after the 16th century.
 - (b) Wheat, native to the Middle East, became a primary food source in North America by the 20th century.
 - (c) Rice, a staple in Asia, was introduced to Europe in the Middle Ages and replaced traditional grains.
 - (d) Corn, originally from Europe, was brought to Africa in the 19th century and became a major part of their diet.
12. Read the following source carefully and answer the questions that follow:
The silk routes are a good example of vibrant pre-modern trade and cultural links between distant parts of the world. The name 'silk routes' points to the importance of West-bound Chinese silk cargoes along this route. Historians have identified several silk routes, over land and

by sea, knitting together vast regions of Asia, and linking Asia with Europe and northern Africa. They are known to have existed since before the Christian Era and thrived almost till the fifteenth century. But Chinese pottery also traveled the same route, as did textiles and spices from India and Southeast Asia. In return, precious metals – gold and silver – flowed from Europe to Asia. Trade and cultural exchange always went hand in hand. Early Christian missionaries almost certainly traveled this route to Asia, as did early Muslim preachers a few centuries later. Much before all this, Buddhism emerged from eastern India and spread in several directions through intersecting points on the silk routes.



- What were the main commodities traded from Europe to Asia along the Silk Routes?
- Identify and describe one major good, other than silk, that was traded on the Silk Routes and discuss its significance in the trade interactions between Europe and Asia.
- Imagine a modern scenario where the Silk Routes are revived as a major trade network with modern infrastructure. Propose how such a revival could impact global trade and cultural exchanges today.

4. Print Culture and the Modern World

Direction: Questions 1 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both (A) and (R) are true, and (R) is the correct explanation of (A).
- Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (A) is true, but (R) is false.
- (A) is false, but (R) is true.

1. **Assertion (A):** Access to books created a new culture of reading.

Reason (R): Books were not only expensive but also not produced in sufficient numbers before the age of print.

(1 M)

2. Why was reading manuscripts not easy in India? Choose the appropriate reason from the following options:

(1 M) (2020)

- Manuscripts were highly cheap.
- Manuscripts were widely spread out.
- Manuscripts were written in English and Hindi.
- Manuscripts were fragile.

3. Which one of the following aspects was common among the writings of Kailashbhashini Debi, Tarabai Shinde and Pandita Ramabai?

(1 M) (2023)

- Demanded economic equality for the masses.
- Highlighted the experiences of women.
- Raised awareness about cultural heritage.
- Motivated Indians for their national freedom.

4. Examine any three effects of Print culture on the French Revolution.

(2023)

5. How did the printing of visual material lead to publishing practices in Japan? Explain. (2023)

6. How had the printing press created a new culture of reading in Europe? Explain with examples.

(3 M) (2024, 2019)

7. How had the Imperial State in China been the major producer of printed material for a long time? Explain with examples.

(3 M) (2019, 2019)

8. How did a new reading public emerge with the printing press? Express in your opinion.

(3 M) (2016, 2015)

9. What led to the colonial government to pass the Vernacular Press Act in 1879? How did it affect the vernacular newspaper?

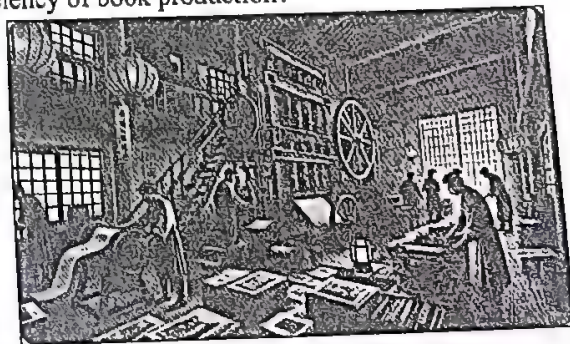
(5 M) (2020, 2015)

10. 'The shift from hand printing to mechanical printing led to the print revolution in Europe.' Explain the statement with examples.

(5 M) (2018, 2015 Term-I)

Competency Based Questions

11. Given that Western printing techniques and mechanical presses were introduced to China in the late nineteenth century, what would be a possible solution to improve the efficiency of book production?



- (a) Continue using hand printing
 - (b) Use cheaper quality paper
 - (c) Adopt Western printing techniques and mechanical presses
 - (d) Reduce the number of books printed
12. Who said, "The printing press is the most powerful engine of progress and public opinion is the force that will sweep despotism away"?
- (a) Johann Gutenberg
 - (b) Martin Luther
 - (c) Louis-Sebastien Mercier
 - (d) Voltaire
13. Read the following source carefully and answer the questions that follow:

Why Newspapers?

'Krishnaji Trimbuck Ranade inhabitant of Poona intends to publish a Newspaper in the Marathi Language with a view of affording useful information on every topic of local interest. It will be open for free discussion on subjects of general utility, scientific investigation and the speculations connected with the antiquities, statistics, curiosities, history and geography of the country and of the Deccan

especially... the patronage and support of all interested in the diffusion of knowledge and Welfare of the People is earnestly solicited.'

Bombay Telegraph and Courier, 6 January 1849

'The task of the native newspapers and political associations is identical to the role of the Opposition in the House of Commons in Parliament in England. That is of critically examining government policy to suggest improvements, by removing those parts that will not be to the benefit of the people, and also by ensuring speedy implementation. These associations ought to carefully study the particular issues, gather diverse relevant information on the nation as well as on what are the possible and desirable improvements, and this will surely earn it considerable influence.'

Native Opinion, 3 April 1870.

- (i) Analyse the primary objective proposed by Ranade for publishing Marathi Language newspaper.
- (ii) Why did the Bombay Telegraph emphasise the role of newspaper in promoting welfare of Deccan region?
- (iii) What were the key responsibilities attributed to native newspapers? Mention any two.

ENGLISH



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LITERATURE (First Flight-Prose)

CHAPTER
1

A Letter to God

—G. L. Fuentes

- ❑ The story is about Lencho, a farmer, who eagerly awaited rain for his crops and rain finally arrived, but it turned into a hailstorm that destroyed their cornfield.
- ❑ Despite the loss, the family held onto hope for help from God. Lencho wrote a letter asking for a hundred pesos to sow his field again and survive until the next Crop; labeled the envelope "To God" and sent the letter to the post office.
- ❑ The postmaster and employees collected money and managed to send Lencho a little more than half of what he requested to support Lencho's faith.
- ❑ Lencho received the money but became angry.
- ❑ He wrote another letter to God, asking for the remaining money and criticizing the post office employees, calling them "bunch of crooks".

CHAPTER
3

Two stories about flying-I (His First Flight)

—Liam O'Flaherty

- ❑ The young seagull was afraid to fly, unlike his siblings.
- ❑ His parents encouraged and threatened him to fly.
- ❑ He watched them catch fish while he stayed hungry.
- ❑ Begging his mother for food, he accidentally flew when she approached with a piece of fish.
- ❑ Though scared initially, he gained confidence and joined his family, enjoying flying over the ocean.
- ❑ His family praised him and offered him food as he successfully completed his first flight.
- ❑ The story explores themes of overcoming fear, gaining independence, and trying new things.

CHAPTER
2

Nelson Mandela: Long walk to freedom

—Nelson Rolihlahla Mandela

- ❑ On May 10, South Africa held its first democratic government inauguration, marking the end of white rule.
- ❑ The ceremonies were held at the Union Buildings in Pretoria, which had been the symbol of white supremacy.
- ❑ International leaders and dignitaries attended the inauguration, making it the largest gathering of its kind in South Africa.
- ❑ Nelson Mandela, accompanied by his daughter Zenani, pledged to uphold the Constitution and work for the well-being of the people.
- ❑ Both the old and new national anthems were sung, symbolizing unity and reconciliation between different racial groups.
- ❑ Mandela described courage as not the absence of fear, but the triumph over it.
- ❑ Mandela highlighted the obligation to both family and country, and the challenges he faced in fulfilling those obligations under apartheid.
- ❑ Mandela praised his people's bravery in fighting apartheid and stressed love over hate, saying freedom belongs to all.

Two stories about flying-II (Black Aeroplane)

—Frederick Forsyth

- ❑ The narrator is flying an old Dakota aeroplane from France to England, looking forward to being with his family.
- ❑ As the flight progresses, the narrator encounters storm clouds ahead, but decides to continue rather than turning back.
- ❑ In the midst of the storm, the narrator spots another aeroplane flying nearby without lights.
- ❑ The pilot of the mysterious black aeroplane waves and signals the narrator to follow.
- ❑ Grateful for the assistance, the narrator obediently follows the black aeroplane, which turns northward.
- ❑ The black aeroplane continues leading the narrator through the storm for half an hour.
- ❑ Suddenly, the narrator emerges from the clouds and sees a runway with lights ahead, indicating an airport.
- ❑ The narrator lands safely, feeling relieved and walks away from his old Dakota.
- ❑ Upon questioning the airport staff about the other pilot, they inform the narrator that no other planes were flying that night.
- ❑ The narrator is left puzzled, as he wonders who guided him through the storm and helped him reach the airport safely.

CHAPTER
4

From the Diary of Anne Frank

—Anne Frank

- ☐ Anne, a 13 year old girl, feels lonely despite being surrounded by family and friends.
- ☐ She decides to start a diary named "Kitty" to find a true friend, as she believes paper has more patience than people.
- ☐ She begins writing about her background and recounts her family's history and early schooling.
- ☐ She then discusses a tense school result day, where she maintains confidence in her abilities and friendships.
- ☐ Her talkative nature annoys her math teacher, Mr Keesing, who assigns her essays on topics like "Chatterbox."
- ☐ Anne responds with humor, eventually writing a satire that stops the strict teacher from pointing her out for talking.

CHAPTER
5

Glimpses of India-I (A Baker from Goa)

—Lucio Rodrigues

- ☐ The village baker holds a significant role in Goan society.
- ☐ The influence of Portuguese culture can still be seen in Goan bread-making traditions.
- ☐ The bakers use traditional furnaces to bake their bread, and the sound of their bamboo can be heard in some places, announcing their arrival in the morning.
- ☐ Cakes and bolinhas are essential for Christmas and other festivals.
- ☐ Bread holds a special place in Goan life and culture, with people fondly remembering the Portuguese days and their famous loaves.
- ☐ Despite modernization and competition, some traditional bakers continue their family profession.

Glimpses of India-II (Coorg)

—Lokesh Abrol

- ☐ Coorg, located in the southwestern part of Karnataka state in India, is a district known for its misty hills, lush forests, and coffee plantations.
- ☐ The native inhabitants of Coorg, known as the Kodavu people, have a unique culture and tradition.
- ☐ According to legend, they are believed to be descendants of Alexander the Great's army.
- ☐ Coffee is the main crop grown on large plantations across the region.
- ☐ Coorg offers various adventure sports such as river rafting, trekking, and camping for tourists.
- ☐ Visitors can also spot elephants, tigers, leopards, deer, and wild boars in their natural habitat.
- ☐ Madikeri serves as the district headquarters and the primary gateway to Coorg, accessible by air or rail.

Glimpses of India-III (Tea from Assam)

—Anup Kumar Datta

- ☐ Pranjol and Rajvir, two friends are traveling to Pranjol's hometown Assam for the summer vacation.
- ☐ During their journey, they discuss about the various 'legends' that are known to have discovered tea.
- ☐ Pranjol is less excited about tea plantations due to his upbringing, while Rajvir finds it fascinating.
- ☐ Rajvir shares legends about tea's discovery, including Chinese and Indian stories.
- ☐ Tea has a long history, originating in China in 2700 B.C. and reaching Europe in the 16th century.
- ☐ They arrive at Dhekiabari Tea Estate managed by Pranjol's father.
- ☐ Rajvir impresses Pranjol's father with his knowledge of tea, including the second-flush period from May to July.
- ☐ The chapter explores tea's cultural significance, worldwide popularity, history, and medicinal associations.



Cheat Sheet

CHAPTER 6 Mijbil the Otter

—Gavin Maxwell

- ❑ The chapter introduces the author, Gavin Maxwell, who lives in Iraq and decides to adopt an otter named Mijbil.
- ❑ Mijbil arrives at Maxwell's house and becomes a mischievous yet endearing companion.
- ❑ Maxwell describes Mijbil's playful nature and how he creates havoc by flooding the house.
- ❑ The author describes Mijbil's mischievous behavior, such as rolling in water and nuzzling his face.
- ❑ The author also discusses the challenges of caring for an otter, including feeding him live fish and dealing with his strong odor.
- ❑ The chapter explores themes of companionship, responsibility, and the relationship between humans and animals.
- ❑ The author reflects on his own emotional attachment to Mijbil and how it changed his perspective on animals as pets.

CHAPTER 7 Madam Rides the Bus

—Vallikkannan

- ❑ Valli, a curious girl, observes her village street from her front door.
- ❑ She desires to ride the bus that passes every half an hour to the nearest town.
- ❑ Valli listens to conversations of her neighbours and bus users to learn about the bus journey.
- ❑ She plans her first bus ride wisely and saves sixty paise for the fare.
- ❑ Valli stops the bus, boards it by herself, and the conductor playfully calls her "MADAM."
- ❑ Some people are concerned, but Valli enjoys the views from the window.
- ❑ In the town, everyone gets off the bus except Valli; she declines offers for a drink due to lack of money.
- ❑ On the return journey, Valli sees a dead cow by the roadside, which saddens her.
- ❑ Valli arrives home, where her mother is talking to her aunt, unaware of Valli's solo bus ride.

CHAPTER 8

The Sermon at Benares (Source: Betty Renshaw *Values and Voices: A College Reader* (1975))

- ❑ Gautama Buddha, born as Siddhartha Gautama, was a prince in northern India.
- ❑ At the age of twenty-five, he encountered the sufferings of the world for the first time and was deeply moved.
- ❑ Seeking enlightenment, he wandered for seven years and eventually sat under a peepal tree.
- ❑ After seven days, he achieved enlightenment and was known as the Buddha.
- ❑ Kisa Gotami, a grieving mother was desperate to find a cure for her son. She sought help from her neighbours, but nobody could help her.
- ❑ Eventually, she learned about the Buddha and went to him, pleading to bring her son back to life.
- ❑ The Buddha asked her to bring him a handful of mustard seeds from a house where no one had lost a loved one, teaching her a valuable lesson about the universality of suffering and death.

CHAPTER 9

The Proposal (Play)

—Anton Chekhov

- ❑ Lomov visits Chubukov's house formally dressed to propose to Natalya Stepanovna.
- ❑ Initially, Chubukov thinks Lomov wants to borrow money, but he's delighted by the proposal.
- ❑ Natalya, wearing an apron, engages in a conversation about their land, Oxen Meadows.
- ❑ An argument erupts as both claim ownership, with Lomov citing historical and legal reasons.
- ❑ Natalya becomes increasingly angry and rejects Lomov's claim. The argument intensifies as they both assert ownership.
- ❑ Chubukov sides with his daughter, declaring the meadows belong to their family.
- ❑ Lomov challenges Chubukov's decision, leading to escalating tension and conflict.
- ❑ Amidst quarrelling over petty issues, they forget the real issue—the marriage proposal.
- ❑ However, good sense prevails in the end.



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LITERATURE (First Flight-Poetry)

CHAPTER
1

Dust of Snow

—Robert Frost

- ☐ The poem starts with a crow shaking down snow, contrasting the dark crow with pure snow.
- ☐ The dust of snow from a hemlock tree symbolizes a small, beautiful, and transformative moment.
- ☐ This simple act shifts the speaker's mood, showing nature's healing power.
- ☐ The dust of snow brings redemption and rescues the speaker from a negative state of mind.
- ☐ The poem emphasizes finding joy in small moments.
- ☐ The choice of the hemlock tree, associated with poison, becomes a source of unexpected beauty.
- ☐ The overarching theme is nature's power to inspire, heal, and transform.

CHAPTER
2

Fire and Ice

—Robert Frost

- ☐ The poem contemplates two theories on the world's end: fire and ice.
- ☐ The speaker aligns with those who believe in a fiery end due to his experience with desire.
- ☐ However, the speaker acknowledges that hate, represented by ice, could also bring destruction.
- ☐ The poem contrasts desire and hate as powerful forces in ending the world.
- ☐ It emphasizes the destructive nature of both fire and ice, suggesting either could cause destruction.

CHAPTER
3

A Tiger in the Zoo

—Leslie Norris

- ☐ The poem begins with a caged tiger, restricted in its movements.
- ☐ The tiger's motions are described as graceful despite its inner rage.
- ☐ It contrasts the tiger's captivity with its natural habitat, where it should be hunting near a water hole.
- ☐ The poem emphasizes the tiger's confinement in a concrete cell, separated from the jungle.
- ☐ The tiger's strength is limited by the cage's bars.
- ☐ The tiger remains indifferent to visitors and focused on its surroundings.
- ☐ The sounds of civilization, like patrolling cars, contrast with the tiger's captive existence.
- ☐ The poem ends with the tiger gazing at the stars, symbolizing its longing for freedom.

CHAPTER
4

How to Tell Wild Animals

—Carolyn Wells

- ☐ The poem provides humorous rules to identify different wild animals.
- ☐ It focuses on specific animals like the Asian Lion, Bengal Tiger, Leopard, Bear, Crocodile, Hyena, and Chameleon.
- ☐ Each stanza presents distinct characteristics or behaviours that help in identifying the respective animal.
- ☐ The poem emphasizes the importance of observing specific cues or actions to differentiate between the animals.
- ☐ It uses rhyme and rhythmic patterns to create a playful and entertaining tone.
- ☐ The imagery and descriptive language add to the imaginative and whimsical nature of the poem.



Cheat Sheet

CHAPTER
5

The Ball Poem

—John Berryman

- ❑ The poem is about a boy who has lost his ball and is left with a feeling of grief.
- ❑ The speaker observes the boy's reaction to the loss and notes that there is no consolation that can be offered.
- ❑ The poem highlights the transience of material things and the importance of learning the ways to accept loss and keep on moving with life.
- ❑ The boy learns the lesson of loss and the fragility of material possessions.
- ❑ The poem suggests that everyone must learn how to cope with loss and stand up after it.

CHAPTER
6

Amanda!

—Robin Klein

- ❑ The speaker repeatedly addresses Amanda with commands and criticisms about her physical appearance and behaviour.
- ❑ Amanda's thoughts wander to imaginary worlds where she becomes a mermaid, an orphan, and Rapunzel.
- ❑ These daydreams represent Amanda's desire for freedom and escape from the constraints of reality.
- ❑ The contrast between the speaker's demands and Amanda's imaginative fantasies highlights her yearning for a different life.
- ❑ The poem explores themes of conformity and societal expectations placed on individuals.
- ❑ Amanda finds solace and tranquility in her imaginary worlds, where she experiences freedom and bliss.
- ❑ The speaker's nagging and criticism continue, but Amanda remains detached, finding comfort in her vivid imagination.
- ❑ Amanda's daydreams serve as a form of resistance against societal norms and expectations.
- ❑ The overall tone of the poem highlights the tension between the external pressures placed on Amanda and her inner world of imagination.

CHAPTER
7

The Trees

—Adrienne Rich

- ❑ The trees inside the house are moving out into the previously empty forest.
- ❑ The roots work all night to disengage themselves from the cracks in the veranda floor.
- ❑ Leaves strain towards the glass, while twigs and boughs exert themselves to break free.
- ❑ The speaker sits inside, writing letters that barely mention the forest's departure.
- ❑ The night is described as fresh, with the whole moon shining and the smell of leaves and lichen spread throughout the rooms.
- ❑ Whispers fill the speaker's head, foreshadowing their impending silence.
- ❑ The glass is breaking, symbolizing a significant shift or rupture.
- ❑ The trees stumble forward into the night, greeted by rushing winds.
- ❑ The moon is broken like a mirror, its pieces flashing in the tallest oak's crown.
- ❑ The poem explores themes of transformation, liberation, human connection to nature, and the resilience of the natural world.

CHAPTER
8

Fog

—Carl Sandburg

- ❑ The poem compares fog to a cat, emphasizing its silent and mysterious nature.
- ❑ The fog approaches the city silently, like a cat on little feet.
- ❑ It settles over the harbour and city, creating a hazy atmosphere and observing its surroundings like a cat on its haunches.
- ❑ The fog eventually moves on, leaving behind a sense of mystery and intrigue.
- ❑ The poem suggests that the fog is a natural phenomenon that can be both beautiful and strange at the same time.
- ❑ Sandburg's use of metaphor and imagery helps to create a vivid and memorable description of the fog.

The Tale of Custard the Dragon

—Ogden Nash

- ☐ Belinda lives in a little white house with a variety of animals: a black kitten (Ink), a grey mouse (Blink), a yellow dog (Mustard), and a pet dragon (Custard).
- ☐ Custard, the dragon, is described as cowardly, with sharp teeth, spikes, scales, and daggers on his toes.
- ☐ Belinda is brave, while Custard is afraid and cries for a safe cage.
- ☐ Ink, Blink, and Mustard tease Custard and laugh at him in a red wagon.
- ☐ Belinda tickles Custard mercilessly while the others mockingly call him Percival.
- ☐ Suddenly, a pirate climbs into the house, wielding pistols and a cutlass.
- ☐ Belinda calls for help, Mustard flees, Ink hides, and Blink strategically escapes through a mousehole.
- ☐ Custard, however, confronts the pirate bravely, attacking him with a clattering tail.
- ☐ The dragon devours the pirate, and Belinda and the others embrace Custard without mourning the pirate's fate.
- ☐ Mustard regrets being flustered, while Ink and Blink believe they could have been braver.
- ☐ Custard admits that everyone else is braver than him.
- ☐ Belinda continues to live with her animals, and Custard still cries for a safe cage despite their bravery.
- ☐ The poem concludes with Belinda's continued life with her pets, including the realio, trulio little pet dragon Custard.

For Anne Gregory

—William Butler Yeats

- ☐ The poem explores the idea that superficial attributes, such as hair colour, can attract attention and affection.
- ☐ The speaker questions whether anyone can truly love her for who she is beyond her physical appearance.
- ☐ She contemplates the possibility of changing her hair colour to test if someone would love her for herself alone.
- ☐ The poem highlights the desire for genuine and unconditional love that goes beyond superficial qualities.
- ☐ The speaker encounters an old religious man who claims that only God can love her for herself alone.
- ☐ The encounter with the religious man raises the question of the nature of love and its true source.
- ☐ The poem touches on the theme of self-worth and the longing for authentic connections.
- ☐ It suggests that love based solely on external attributes may be shallow and fleeting.
- ☐ The speaker's contemplation reflects the universal desire for genuine love and acceptance.
- ☐ The poem explores the complexities of relationships and the search for deep connections based on inner qualities.



LITERATURE (Footprints without Feet)

CHAPTER
1

A Triumph of Surgery

—James Herriot

- ☐ Tricki, a small dog, is overly pampered and overweight. Tricki's owner, Mrs. Pumphrey, consults the narrator, a veterinary surgeon, due to Tricki's declining health.
- ☐ The narrator advises Mrs. Pumphrey to put Tricki on a strict diet and increase his exercise.
- ☐ Mrs. Pumphrey finds it difficult to adhere to the new regimen and pampers Tricki with excessive treats and comforts.
- ☐ The narrator decides to hospitalize Tricki to monitor his progress and save him from further health complications.
- ☐ Tricki shows signs of improvement and gradually becomes active and socializes with other dogs. Mrs. Pumphrey anxiously sends extravagant gifts to aid Tricki's improvement.
- ☐ After two weeks, when Tricki has fully recovered, he happily reunites with Mrs. Pumphrey and displays his newfound energy.

CHAPTER
2

The Thief's Story

—Ruskin Bond

- ☐ The protagonist, an experienced thief, encounters Anil, a trusting young man.
- ☐ The thief assumes a false identity and offers to work for Anil without pay.
- ☐ Anil takes the thief in, teaching him cooking and writing.
- ☐ The thief thinks about stealing the money Anil made from selling a book.
- ☐ Despite hesitation, the thief steals the money but couldn't escape on a train, as planned.
- ☐ Regret sets in as the thief realizes the weight of his actions in the rain-soaked night.
- ☐ The thief decides to return the stolen money, driven by the value of education and a chance for a better life.
- ☐ Anil reveals he knew about the theft but shows no anger or disappointment.
- ☐ Anil continues to teach the thief, promising regular payment and reinforcing trust.

CHAPTER
3

The Midnight Visitor

—Robert Arthur

- ☐ Ausable, who is described as fat and with an American accent, doesn't fit the typical image of a secret agent.
- ☐ Ausable invites Fowler, a young writer, to his small and unromantic hotel room in France.
- ☐ Ausable dismisses Fowler's disappointment and assures him that an important paper is expected to arrive, which may have an impact on history.
- ☐ Ausable seems surprised by Max's presence and asks him why he is in his room.
- ☐ Max intends to take the important report from Ausable, claiming it will be safer in his hands.
- ☐ Ausable mentions that someone had previously entered his room through a balcony that belonged to the adjacent apartment.
- ☐ Max learns about the balcony but says he used a passkey to enter.
- ☐ With a sudden knock at the door, Ausable explains that he asked the police to check on him for extra protection, causing Max to become nervous.
- ☐ As Max threatens to shoot and demands Ausable to send the police away, while he goes out to the balcony in the
- ☐ Fowler is confused and mentions the police, but Ausable reveals there were no police, only the waiter.
- ☐ Ausable explains that there is no balcony, suggesting Max's escape route is non-existent.

- ☐ Horace Danby, a seemingly respectable citizen, is revealed to be a skilled thief who steals rare books every year.
- ☐ Horace meticulously plans his robberies and uses the stolen money to buy books through an agent.
- ☐ He targets Shotover Grange, a house with valuable jewels worth thousands of pounds.
- ☐ Horace enters the house, carefully avoiding leaving any fingerprints, but is interrupted by a young woman.
- ☐ The woman engages in a conversation with Horace, revealing her knowledge of his intentions and offering a deal to spare him if he helps her retrieve her jewels from the safe.
- ☐ Horace, desperate to avoid prison, agrees and successfully opens the safe, returning the jewels to the woman.
- ☐ After two days, Horace is arrested for the jewel robbery, as his fingerprints are found at the crime scene.
- ☐ Despite his claims of being manipulated by the woman, no one believes him, and he is sentenced to prison.
- ☐ Horace becomes an assistant librarian in the prison, reflecting on the cunning young woman who deceived him and rejected the notion of "honour among thieves".

- ☐ The story is about a scientist who discovers how to make the human body transparent.
- ☐ The two boys in the story are surprised to see muddy footprints of a barefooted man on the steps of a house in London.
- ☐ The boys follow the footprints and witness more appearing out of nowhere, leading them down the street.
- ☐ The invisible man in the story is named Griffin.
- ☐ Griffin becomes homeless and breaks into a restaurant to find food and shelter.
- ☐ Griffin steals sweets and wine from a grocery store before settling down to sleep on a pile of quilts.
- ☐ He oversleeps there and is caught by assistants who arrive at the restaurant in the morning.
- ☐ Griffin initially stays at an Inn in Iping Village which is run by a landlady named Mrs. Hall.
- ☐ Mrs. Hall becomes increasingly suspicious of Griffin's behavior, as he refuses to show himself or explain his strange actions.
- ☐ Griffin's invisibility causes Mrs. Hall to become increasingly afraid of him, as she cannot see or predict his movements.
- ☐ Mrs. Hall tries to confront Griffin about his behavior but is met with hostility and aggression.
- ☐ When Griffin leaves the inn without paying his rent, Mrs. Hall becomes determined to track him down with the help of the community members.
- ☐ People try to help Griffin, but he hits them with blows that seem to come from nowhere.
- ☐ Jaffers, a police officer, tries to catch Griffin but is knocked unconscious in the process.
- ☐ The story raises questions about whether it would be scientifically possible for a man to become invisible or transparent.



Cheat Sheet

CHAPTER
6

The Making of a Scientist

—Richard Ebright

- ❑ Richard Ebright's journey into the world of science began with his childhood fascination with collecting butterflies, rocks, fossils, and coins.
- ❑ His mother played a pivotal role in encouraging his love for learning and providing him with resources and opportunities to explore his interests.
- ❑ The book "The Travels of Monarch X" opened his eyes to the wonders of butterfly migrations and sparked his scientific curiosity.
- ❑ Ebright participated in butterfly tagging research, raising and tagging thousands of monarch butterflies in his basement.
- ❑ Despite a setback at a science fair, he learned the importance of conducting real experiments and dedicated himself to more substantial projects.
- ❑ His research on viral diseases in monarch caterpillars and the mimicry of viceroy butterflies earned him recognition and awards at science fairs.
- ❑ Ebright's investigation into the purpose of gold spots on monarch pupae led to the discovery of an unknown insect hormone and his theory on cell life.
- ❑ His findings have the potential to deepen our understanding of life processes and may have implications for disease prevention.
- ❑ Alongside his scientific pursuits, Ebright excelled academically, engaged in debate and public speaking, and developed skills in photography and outdoor activities.
- ❑ Ebright's dedication, competitive spirit, and unwavering curiosity contribute to his success as a scientist, and his journey serves as an inspiration for aspiring researchers.

CHAPTER
7

The Necklace

—Guy de Maupassant

- ❑ Mme Loisel is unhappy because she believes she was born for a life of luxury and elegance, but she married a humble clerk and lives in poverty.
- ❑ Mme Loisel's husband surprises her with an invitation to a grand party at the Minister's residence, but she is upset because she has no suitable dress or jewellery.
- ❑ Mme Loisel borrows a beautiful diamond necklace from her friend Mme Forestier for the party.
- ❑ At the party, Mme Loisel is a great success and enjoys the admiration of others, but she loses the necklace on the way home.
- ❑ Mme Loisel and her husband search for the necklace but are unable to find it, so they decide to replace it without Mme Forestier's knowledge.
- ❑ They purchase a new necklace, taking out loans and living a life of poverty for ten years to repay the debt.
- ❑ Mme Loisel encounters Mme Forestier after many years and reveals the truth about the lost necklace and their struggles to replace it.
- ❑ Mme Forestier confesses that the original necklace was a fake, worth only a fraction of the cost of the replacement.
- ❑ Mme Loisel realizes that their years of hardship were unnecessary, and she feels a mix of contentment and pride for enduring the challenges.
- ❑ The story highlights the theme of the deceptive nature of appearances and the consequences of excessive desire for material wealth.

- ❑ Sulekha, known as Bholi, was the fourth daughter of Numberdar Ramlal and was considered a simpleton.
- ❑ Bholi had facial disfigurement from smallpox and also suffered from a speech impediment, causing her to be teased and mocked by other children.
- ❑ Ramlal had seven children, and Bholi was the youngest who lacked good looks and intelligence.
- ❑ A primary school for girls opened in their village, and the Tehsildar urged Ramlal to send his daughters to school as an example to others.
- ❑ Bholi's mother was initially against sending the girls to school, fearing it would affect their chances of marriage.
- ❑ She suggested sending Bholi, believing the teachers could deal with her.
- ❑ Bholi's first day at school is filled with fear and discomfort, but she finds solace in the kind and understanding teacher who encourages her.
- ❑ The teacher helps Bholi overcome her stammering and instills in her a sense of hope and a desire for education.
- ❑ Years pass, and Bholi's parents consider a marriage proposal from Bishamber Nath, a well-to-do grocer.
- ❑ Bishamber demands dowry and is disgusted by Bholi's disfigured face, causing Bholi to refuse the marriage and speak up against his greed.
- ❑ Bholi asserts herself, refusing to marry an old, greedy man, despite the shame and criticism from others.
- ❑ Bholi decides to dedicate her life to serving her parents and becoming a teacher in the same school where she learned.
- ❑ Bholi's transformation from a neglected and voiceless girl to a confident and determined young woman showcases the power of education and self-belief.

- ❑ The twentieth century was known as the 'Era of the Book' due to the abundance and significance of books during that time.
- ❑ In the twenty-first century, Earth faced a potential invasion from Martians in the year 2040.
- ❑ A single book played a crucial role in preventing the Martian invasion.
- ❑ Think-Tank, the powerful Martian commander-in-chief, attempts to invade Earth with the help of Lieutenant Iota, Sergeant Oop, and Captain Omega.
- ❑ Think-Tank consults his mirror, considering himself the most intellectually gifted being in the universe.
- ❑ The Martian crew arrives on Earth and is puzzled by the presence of books in a public library, mistaking them for hats or a storage barn.
- ❑ Think-Tank identifies the books as communication sandwiches and orders the crew to listen to them.
- ❑ The crew realizes the books are meant for visual communication, not auditory, and attempt to decipher the code within them.
- ❑ By taking intelligence-boosting vitamins, the crew successfully decodes a nursery rhyme, discovering Earth's ability to combine agriculture and mining.
- ❑ Think-Tank recognizes the significance of the discovery, as Earthlings can grow rare metals like silver and even cultivate resources like cockle shells.
- ❑ The story sets the stage for an exciting adventure where a book becomes the key to saving Earth from an impending Martian invasion.
- ❑ The chapter highlights the importance of books and their potential to hold valuable knowledge and information.



Reading Skills

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Reading Comprehension

1

Steps to attempt Reading Comprehension

1. **Avoid overemphasizing details:** While details are important, focus on understanding the main point rather than getting caught up in examples and illustrations. Comprehending the overall flow and structure will help in analyzing and answering questions.
2. **Don't memorize:** There is no need to memorize every word in the passage. Prioritize understanding the flow, structure, and main points. For specific questions, you can always refer back to the passage.
3. **Read the questions first:** Before reading the passage, go through the questions. This prepares you to focus on the information you need to find in the passage. Focus on the questions themselves rather than a specific answer option. A quick overview of the questions is sufficient.
4. **Vocabulary skills are not the primary focus:** While having a strong vocabulary is beneficial, not having an extensive vocabulary won't prevent you from understanding the passage. Focus on grasping the main idea and don't get stuck on particular words.
5. **Objective-Type Questions:** To find the correct option in Multiple Choice Questions, go through all the options. Re-read the passage and then tick the correct option. To find answers to the vocabulary-based questions like synonyms, antonyms etc., replace the word with the meaning. If you find that it is the same in meaning, the answer is correct.
6. **Focus on the information within the passage:** The correct answer is always based on the information given in the passage. Avoid getting distracted by answer options that are out of scope.
7. **Be cautious of "trigger words":** Pay attention while reading and don't get trapped by "trigger words." These words may shift the focus of the passage or introduce contrasting information. Skimming or rushing through the passage may lead to confusion.
8. **Take notes:** When reading obscure or abstract texts, make quick notes for reference. Note down the general flow, structure, paragraph-wise flow, and important points. The notes don't have to be extensive, just highlight the essential markers/points in the passage.
9. **Anticipate questions:** Although challenging, try to identify possible questions while reading the passage. Predict which parts of the passage are likely to be the basis for questions.
10. **Pay extra attention to opening and closing paragraphs:** Questions like the main idea question often relate to the overall subject of the passage, and the answers are frequently found in the first and last paragraphs. Extract as much information as possible from these paragraphs.

Two types of Passages asked by CBSE

(i) Discursive Passage (400–450 words):

- ☐ Includes the opinion of a person, which is generally argumentative, persuasive and interpretative.
- ☐ Sometimes the author presents his views with great depth of reasoning to persuade the reader.

(ii) Case-Based Factual Passage (200–250 words):

- ☐ Composed of visual and verbal inputs such as graphs, pie charts, slope graphs etc.
- ☐ These passages focus completely on details or facts.



Writing

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1

Formal Letter

Key highlights:

- ☐ Use polite, simple and everyday language to convey the message clearly.
- ☐ Avoid using abbreviations as much as possible.
- ☐ Carefully use the information provided in the question.
- ☐ The modes of address and name of sender/receiver vary according to the type of letter and the receiver.
- ☐ Clear and exact descriptions of the articles required with the expected quality and quantity should be listed when writing a letter for placing an order.

Format:

- ☐ **Sender's address:** While writing the address, do not put a comma at the end of each line.
E.g.
 D-285
 Anand Vihar
 New Delhi- 210031
 - ☐ **Date:** While writing the date, remember the day is written in figures, the month in words and the year in full figures. (Do not write: 15-09-2023)
E.g.
 15 September, 2023
 - ☐ **Receiver's address:** The receiver can be the firm's name or the one who represents the firm. Make sure to use the name provided (if) in the question.
E.g.
 The Editor
 The Times of India
 Darya Ganj
 Delhi - 110002
 - ☐ **Subject:** Subject must be as brief as possible, with a maximum of three or four words. It expresses the main theme or crux of the letter clearly.
 - ☐ **Salutation:** In Official letters, we generally use Dear Sir/Madam. If the person, who is going to read the letter, is known to you, you can address him by name.
Eg.
 Dear Mr. Arora
 - ☐ **Body:**
 - (i) **Introductory Paragraph/Sentence:** States the purpose of writing.
 - (ii) **Informative Paragraph:** Details of the problems, cause, effect, possible solution etc.
 - (iii) **Concluding Paragraph/Sentence:** States your hope, comment, request, suggestion etc.
 - ☐ **Complimentary Close:** This is a courteous way of ending a letter. For this, we write Yours sincerely/Yours faithfully/ Yours truly. (largely accepted: Yours truly- for editor and Yours sincerely- formal /business)
- Note:** The first letter of the second word (here, 's', 'f', 't') is never written in capital letters.
- ☐ **Closing:** Name, Signature and Designation (if given)



Analytical Paragraph

2

Key highlights:

- ☐ Brief and comprehensive.
- ☐ Stick to the facts, use simple and accurate language.
- ☐ Choose the important information, organize it well.
- ☐ Look for the differences that are noticeable.
- ☐ Mention the aspect which is the smallest or the largest in the data given. Any aspect that is similar should be mentioned next.
- ☐ Further mention about the aspect that has remained unchanged or is constant throughout.

Format

Introduction: The first paragraph should describe in brief what the graph is about. It should be like an **opening paragraph** that introduces the reader to the context of the chart given. When writing the introductory paragraph, you need not go into the details.

Body: This part of the analytical paragraph should contain details of the graph/chart given in the question. It is extremely important to choose the significant details that should be included in the paragraph.

The body can be broken into two or three sub-paragraphs depending on the information extracted from the graph, if required. Breaking the body into sub-paragraphs makes it easy for the reader to understand.

Conclusion: The last paragraph should conclude the paragraph giving the overall view or summary of the graph. It should be concluding in nature and act as the closing statement. One should keep in mind that one must not include any personal opinions, conclusions, or observations. You should simply stick to the facts.

Useful Tips for Writing an Analytical Paragraph

- ☐ For the introduction, use phrases such as The line graph shows.../The given table suggests.../The chart given above describes.../The data given provides information about.../The pie chart illustrates..., etc.
- ☐ For describing trends, use phrases and words such as a pattern of growth.../rapidly doubled/skyrocketed/ striking increase/peaked/declined/levelled off/stagnated/fluctuate/starting to rise/starting to fall/slightly etc.
- ☐ For describing quantities, use one-third of/nearly one-fourth of/30% of/almost 80%/majority of/on average/twice as much/almost equal/the highest/the lowest/ roughly/approximately 5% of/just under three per cent etc.
- ☐ For establishing a relationship or contrast, use words and phrases like- relationship between/similarly/in contrast with/in comparison to/but in the opposite case/however/whereas/as opposed to/while/noticeable difference etc.
- ☐ For the conclusion and other connecting phrases, use-overall/subsequently/in a nutshell/for the chart given/in short/striking changes/therefore etc.



Grammar

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CHAPTER
1

Determiners

A determiner is a word that is used before a noun or noun phrase to refer to the noun in the context.

Eg. I have lost my keys.

1. Articles

A and *An* are referred to as indefinite articles, whereas *the* is referred to as a definitive article. The distinction between *A* and *An* is made based on sound.

A: Before words that start with a consonant sound.

Eg. A one-rupee coin, a dog, a union, a European, etc.

An: Before words with a vowel sound.

Eg. An hour, an heir, an eye, an M.A., an S.D.O., an hour, etc.

The: Before unique nouns; when an entire class is referred to by a singular noun; before an adjective in the exemplary degree.

Eg. The sun, the dog, the tallest, etc.

2. Demonstratives

Demonstratives help us point to things, events, or people in relation to ourselves. They can show if something is close or far, both physically and in our minds. When we talk about things happening now, we usually use words like 'this' to point to them. When we talk about things from the past, we use words like 'that' to show they are farther away. Demonstratives include the words 'this,' 'these,' 'there,' 'those,' and 'that.'

3. Possessives

To indicate who owns or "possesses" something, we use possessive determiners. Possessive determiners, like all determiners, are placed in front of any adjective at the start of a noun phrase (s). Possessive determiners include pronouns such as 'my,' 'your,' 'our,' 'his,' 'her,' 'their' and 'its'.

4. Quantifiers

Quantifiers are words which are placed before nouns to quantify a noun i.e., they indicate an amount or quantity.

Eg. some milk, most children, many pens, a few of them, a lot of fruits etc.

5. Cardinals or Numbers

Numbers such as one, three, hundred etc. are cardinal numbers. We most commonly use cardinal numbers as determiners (before nouns).

6. Ordinals

These determiners are used to tell the order of the nouns. These are to work out the class or present the position of the subject in the sentence.

Eg. first, last, next, eleventh, previous, subsequent etc.

7. Interrogatives

Interrogatives modifies a noun or pronoun in a direct or indirect question.

Eg. what, which, whose, who, how, when, why, etc.

8. Distributives

Distributives are used to refer to a group or to individual people or objects within a group.

Eg. all, each, every, both, half, either, neither, etc.

Tenses

Tense is the form taken by a verb to indicate when an action began, continued, or ended. It is divided into three categories:

- **Present Tense:** Events occurring in the present.
- **Past Tense:** Events that took place in the past.
- **Future Tense:** Events that will take place in the future.

Note:

- While answering the questions related to tenses, it is important to understand the time of action, as it will help choose the right verb form.
- As a general tip, it is important to be consistent with the verb form in the sentence or text until the theme or time of action needs to change.
- Make sure to read the sentence after answering the questions, as it will help remove grammatical errors.

Important points

- Singular Subject-Singular verb (She prays.)
- Plural Subject-Plural Verb (We pray)
- Singular Subject + Has
- Plural Subject + Have
- Verb + 'ing' in all Continuous Tenses shows the actions' continuity.
- Use Did with V1 E.g.

I didn't see him. (correct)

I didn't saw him. (incorrect)

| Tense | Indefinite/Simple | Progressive/Continuous | Perfect | Perfect Continuous |
|---------|---|---|--|---|
| Present | S + V ₁ + (With plural subjects + O) S + V ₁ + s/es (With Singular Subjects + O) | S + is/am/are/(V ₁ + ing) + O | S + has/have + V ₃ + O | S + has/have + been + V ₁ + ing) + since/for + O |
| Past | S + V ₂ + O | S + was/were + (V ₁ + ing + O) | S + had + V ₃ + O | S + had been + V ₁ + ing) + since/for + O |
| Future | S + will/shall + V ₁ + O | S + will be/shall be + (V ₁ + ing) + O | S + <u>will/shall</u> + V ₃ + O | S + <u>will/shall</u> + been + (V ₁ + ing) + since/for + O |

Note: 'Shall' is used with 1st person (We/I), 'will' is used with 2nd and 3rd person.

Order of will/shall in interchanged in compulsory case

S = Subject, V = Verb, O = Object

A *modal* is a type of verb indicating hypothetical conditions such as possibility, ability, necessity, likelihood, ability, permission, intent, request, capacity, suggestion, order, obligation, or advice.

Main Modals include:

Can, Could, Will, Would, Shall, Should, May, Might, Must, Ought to

Oftentimes the base form of a verb is accompanied by a modal verb so that its meaning changes slightly. They are never used alone. They are always followed by the base form (infinitive) of the main verb.

E.g. Soldiers **must** obey the orders of their officers.

(modal) (main verb)

Note:

- ☐ Modals do not change form based on the subject (*E.g.*, He can, They can).
- ☐ Modals are followed by the base form of the verb (*E.g.*, She must go).
- ☐ Questions with modals are formed without the auxiliary 'do' (*E.g.*, Can you help?).

Might vs Could

'Might' and 'Could' are less definite and more hesitant than 'May', suggesting a smaller chance.

E.g. Joe might come with me. (perhaps a 30% chance)

I may go to London tomorrow. (perhaps a 50% chance)

Should vs Must

'Should' can be used as a weaker form of 'must'

E.g. That carpet should be cleaned. (It would be a good idea.)

That carpet must be cleaned. (It is absolutely necessary.)

Should vs Ought to

'Should' and 'ought to' are similar in meaning and can often replace each other. They are both used to talk about obligation and duty, to give and ask for advice, and to say what we think is right for people to do. Also, 'should' is more common than 'ought to' as it is less formal.

E.g. They ought to/should be more sensible.



Subject-Verb Agreement

Subject-verb agreement refers to the grammatical rule where the subject and verb in a sentence must agree in number (singular or plural). Some of the common points of Subject-Verb Agreement are:

- ☐ Singular subjects - Singular verbs.
- ☐ Plural subjects- Plural verbs.

Indefinite Pronouns: Pronouns such as everyone, someone, nobody, no one etc. take singular verbs.

Eg. Everyone is present.

Some vs Any: Some- used in positive sentences and questions when we offer or request, Any- used in negative sentences and questions

Eg. I don't have any pens. Do you have some pens?

Collective Nouns: Words like 'team', 'group', 'audience' are collective nouns and can take either singular or plural verbs, depending on whether the group is acting as one unit or as separate individuals.

Eg. The team is playing well. (as one unit)

The team are arguing among themselves. (as separate individuals)

Quantities: Expressions of quantity or amount (*E.g.*, 'a lot of', 'a few', 'some') take the verb form of the noun they refer to.

Eg. A lot of the cake is gone.

Eg. Some pages were lost.

Neither/Nor and Either/Or: When using 'neither/nor' or 'either/or', the verb agrees with the subject closer to it.

Eg. Neither the teacher nor the students are ready.

Eg. Either the students or the teacher is ready.

Titles and Names: Titles of books, movies, and other works, as well as names of countries or organizations that are plural in form, take a singular verb.

Eg. 'The United States is a country.'

Eg. 'The Chronicles of Narnia is a popular series.'

Amounts and Measurements: When considered as a single unit, amounts and measurements take a singular verb.

Eg. Five kilometres is a long distance to run.

Eg. Twenty pounds is a lot of money.

There is vs. There are: Use 'there is' for singular nouns and 'there are' for plural nouns.

Eg. There is a book on the table.

Eg. There are books on the table.

Reported speech, also known as indirect speech, conveys what someone else has said, but without quoting their exact words. It is used to report the words of a speaker without quoting them directly. While Reported Speech is a vast topic, some of the important points are given below.

Key Changes

1. Pronouns may change.
2. Tense often changes.
3. Time expressions might change.

Eg: Direct Speech: He said, "I am going to the market."

Reported Speech: He said that he was going to the market.

Tense Changes

Present Simple → Past Simple

Present Continuous → Past Continuous

Present Perfect → Past Perfect

Present Perfect Continuous → Past Perfect Continuous

Past Simple → Past Perfect (though can remain unchanged in some contexts)

Will → Would

Can → Could

Time Expression Changes

today → that day

tomorrow → the next day or the following day

yesterday → the day before or the previous day

here → there

now → then

last week/month/year → the previous week/month/year

Reporting Verb Changes

Commonly used verbs include: say, tell, ask, advise, suggest, order, etc.

Questions

Direct: "Where is the library?"

Reported: He asked where the library was.

Commands/Requests

Direct: "Close the door."

Reported: He asked me to close the door.

Statements

Direct: "I love chocolate."

Reported: She said that she loved chocolate.

Suggestions

Direct: "Let's go to the park."

Reported: He suggested going to the park.

Most Probable Questions (Analyzed & Selected)

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Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.

FIRST FLIGHT: PROSE

A Letter to God

1. Why did Lencho's happy mood change into concern?
(3 M) (2023, 2020)
2. What are the raindrops compared to and why?
(3 M) (APQ-2023, 2023)

Competency Based Questions

3. Why did Lencho say the raindrops were like 'new silver coins'? How did the same rain change the face of his cornfield?
(6 M)
 4. "Humanity still exists"; this is what we get to know after reading 'A letter to God' in which the firm faith in God of a poor farmer and the helpfulness of the post office employees are aptly depicted. Write a paragraph on the values in it, in about 80-100 words. Give the paragraph a suitable title.
(6 M)
 5. Read the following extract and answer the questions/complete the sentences that follow.
(5 M)
- Lencho was a man of strong faith. For him, God was not an abstract belief but a concrete, physical presence. He went about his work and his life with the assurance of one who knows that God is always watching over him.
- (i) What is the main theme of this story? 1
 - (a) The power of faith and prayer.
 - (b) The importance of hard work and perseverance.
 - (c) The dangers of relying on others for help.
 - (d) The consequences of greed and dishonesty.
 - (ii) What can be inferred about Lencho's perception of God based on the given extract? 1
 - (iii) Which word from the extract means a feeling of confidence or certainty? 1
 - (iv) What does the author imply about the nature of Lencho's relationship with God through the statement that God is a "concrete, physical presence"? 2

Nelson Mandela-Long Walk To Freedom

1. 'No one is born hating another person because of the colour of his skin, or his background or his religion'. Do you agree? Elaborate on the basis of the chapter "Nelson Mandela - Long walk to freedom".
(3 M or 6 M) (SQP-2023, APQ-2023, 2023)
2. What did Nelson Mandela remember on the day of the inaugural ceremony?
(2 M) (2020, 2015)

Competency Based Questions

3. Describe the value of freedom for human beings and how it is important for the growth of civilisation and humanism as described in the lesson 'Nelson Mandela: Long Walk to Freedom'.
(6 M)
 4. Why does Mandela say that freedom is indivisible? How are the oppressed and the oppressor alike robbed of their humanity?
(6 M)
 5. Read the following extract and answer the questions/complete the sentences that follow:
(5 M)
- This is the occasion for mutual help and mutual cooperation. We must know what our duty is as true citizens. Your teacher has to impart that duty. Unless we learn to shoulder our responsibility in the true spirit of discipline and citizenship we cannot go ahead. We must strengthen our shoulders and our legs so that we can stand erect and bear the burden that has devolved on us. Then alone would we secure the real objective of freedom.
- (i) What is the objective of freedom according to the given extract? 1
 - (a) To stand erect.
 - (b) To shoulder responsibility.
 - (c) To bear burden.
 - (d) To achieve independence.
 - (ii) What does the extract suggest about the relationship between discipline, citizenship, and achieving the objective of freedom? 1
 - (iii) The phrase 'devolved on us' means _____. 1
 - (iv) How does the given extract emphasize the importance of mutual cooperation and responsibility in achieving freedom? 2

Two Stories About Flying

1. "The sight of the food saddened him". What does this suggest? (2 M or 3 M) (APQ-2023, 2020)
2. Motivation plays an important role in taking risks in life and in succeeding. Do you agree? Discuss with reference to the pike of the old Dakota and the young seagull. (3 M or 6 M) (APQ-2023, 2023)
3. Describe the young seagull's first flight. (3 M) (2024, 2023)
4. How did the seagull's parents try to make him fly? (2 M or 4 M) (2019, 2016)

Competency Based Questions

5. Was the young seagull same at the beginning and at the end of the lesson? Compare and contrast the two kinds of the same seagull in the lesson. (6 M)
6. What message does the story 'His First Flight' convey? (6 M)
7. Read the following extract and answer the questions/complete the sentences that follow: (5 M)
The day before, all day long, he had watched his parents flying about with his brothers and sister, perfecting them in the art of flight, teaching them how to skim the waves and how to dive for fish. He had, in fact, seen his older brother catch his first herring and devour it, standing on a rock, while his parents circled around raising a proud cackle. And all morning the whole family had walked about on the big plateau midway down the opposite cliff taunting him with his cowardice.
 - (i) How did the family taunt the protagonist? 1
(a) By flying high above him.
(b) By teaching him to dive for fish.
(c) By taunting him with his cowardice.
(d) By catching more fish than him.
 - (ii) What does the term "plateau" mean in the given context? 1
 - (iii) What can be inferred about the bird's feelings and experience? 2
 - (iv) The word _____ in the extract means to 'move lightly just above the surface of the sea'. 1

From the Diary of Anne Frank

1. How did Kitty help Anne overcome her loneliness? (2 M or 10 M) (2019, 2016)

Competency Based Questions

2. Justify the title, 'The Diary of A Young Girl'. (6 M) (CBSE, 2019)

3. You have been chosen to present your evaluation on "Sometimes we learn many things from the act of punishment. Write this presentation draft including your insights, in about 120 words in reference to the lesson 'From the diary of Anne Frank'." (6 M)

4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

I started right away at the Montessori nursery school. I stayed there until I was six, at which time I started in the first form. In the sixth form my teacher was Mrs. Kuperus, the headmistress. At the end of the year we were both in tears as we said a heartbreaking farewell. In the summer of 1941 Grandma fell ill and had to have an operation, so my birthday passed with little celebration. (CBSE, 2023)

- (i) The narrator 'I' refers to
(a) Mr. Keesing (b) Mrs. Kuperus
(c) Anne Frank (d) Miss Margot
- (ii) The phrase 'right away' in this extract most nearly means
(a) with delay (b) the correct way
(c) immediately (d) overtaking from right
- (iii) What does the narrator mean by saying 'we were both in tears'?
- (iv) Complete the analogy by selecting a word from the text: dawn : dusk : mourning: _____
- (v) Select the option that correctly captures the application of the word 'form' as used in the extract.
(a) Raghav was in good form while playing the match.
(b) Saheb was promoted to the next form after the annual exam.
(c) My brother did not know how to form a circle.
(d) Anne saw the form on the headmaster's desk.

Glimpses of India

1. Who are paders and why are they friends of children? (2 M or 3 M) (2023, 2017)
2. How is the Coorgi tradition of courage and bravery recognised in modern India? (2 M) (CBSE QB, 2019)
3. Why is Coorg called the land of the rolling hills? (2 M) (2022, 2020)
4. Which season is the best to visit Coorg? (2 M) (2015, 2014)
5. What legends are associated with the origin of tea? (2 M) (CBSE QB, 2016)

- What do the elders in Goa still love to remember?
(2 M or 3 M) (2022, 2017)
- What excited Rajvir? Why did Pranjol not share his excitement?
(2 M) (CBSE QII, 2018)
- How is the Goan baker still an important part of the life of a Goan village?
(3 M) (SQP-2023, 2023)

Competency Based Questions

- After reading the story 'A Baker from Goa', do you think our traditions, heritage, values and practices are the roots that nourish us? Why/why not?
(6 M)
- The author of the lesson "Coorg" informs us that the fiercely independent Coorg people are possibly of Greek or Arabic origin.
(6 M)
- Read the following extract and answer the questions/complete the sentences that follow:
(5 M)
- "Chai-garam... garam-chai," a vendor called out in a high-pitched voice. He came up to their window and asked, "Chai, sa'ab?" "Give us two cups," Pranjol said. They sipped the steaming hot liquid. Almost everyone in their compartment was drinking tea too. "Do you know that over eighty crore cups of tea are drunk every day throughout the world?" Rajvir said. "Whew!" exclaimed Pranjol. "Tea really is very popular."
- (i) What was Pranjol's reaction upon hearing about the global tea consumption?
1
(a) Surprise (b) Disbelief
(c) Excitement (d) Indifference
- (ii) Write a word from the passage for "emitting steam". 1
- (iii) Based on the passage, what can be inferred about the popularity of tea among the passengers in the compartment?
1
- (iv) Explore the global consumption of tea and its impact on the economy and trade. How does the high demand for tea affect tea-producing regions and international tea markets?
2

Mijbil the Otter

- What happened when Maxwell took Mijbil to the bathroom? What did it do two days after that?
(3 M or 8 M) (2019, 2015)

Competency Based Questions

- What things does Mij do which tell you that he is an intelligent, friendly and fun-loving animal who needs love?
(6 M) (CBSE, 2015)
- What is the main theme of "Mijbil the Otter" by Gavin Maxwell? How does the author explore this theme? (6 M)

4. Read the following extract and answer the questions/complete the sentences that follow:
(5 M)

Two days later, Mijbil escaped from my bedroom as I entered it, and I turned to see his tail disappearing round the bend of the corridor that led to the bathroom. By the time I got there he was up on the end of the bathtub and fumbling at the chromium taps with his paws. I watched, amazed; in less than a minute he had turned the tap far enough to produce a trickle of water, and after a moment or two achieved the full flow.

- (i) Discuss the impact of Mijbil's escape and his actions in the bathroom on the narrator's perception of the otter. How does this incident contribute to the development of their relationship?
2
- (ii) Based on the passage, what can be inferred about Mijbil's intelligence and adaptability?
1
- (iii) What does the term "chromium" refer to in the passage?
1
- (iv) A. Mij loves water.
B. Mij was intelligent enough to open the water taps. 1
(a) (A) is true (B) is false.
(b) (A) is false (B) is true.
(c) Both are true.
(d) Both are false.

Madam Rides the Bus

1. Whenever we want to achieve something, difficulties always come in our way. What did Valli have to do to go and ride in a bus?
(4 M or 8 M) (2020, 2017)
2. Valli was an extra-ordinary girl who had self-confidence and courage to realise her ambition by planning and drawing on her spirit of adventure. Discuss in reference to the chapter 'Madam Rides the Bus'.
(4 M or 6 M) (2023, 2022)
3. How did Valli gather the details of the bus journey?
(3 M or 4 M) (2023, 2022)
4. What was the most fascinating thing that Valli saw on the street?
(2 M) (2019, 2016)

Competency Based Questions

5. Valli was an extra-ordinary girl who had self-confidence and courage to realise her ambition by planning and drawing on her spirit of adventure. Discuss in reference to the chapter 'Madam Rides the Bus'. (6 M) (CBSE, 2023)
6. "Never mind", she said, "I can get on by myself." "You don't have to help me," said Valli to the conductor. She shows extraordinary courage in taking the bus journey all alone. Taking inspiration from Valli's character, write how the ability and courage to take risks are essential to fulfill one's dream.
(2 M or 4 M) (2017, 2015)

7. Read the following extract and answer the questions/complete the sentences that follow! (5 M)

Valli found the woman absolutely repulsive — such big holes she had in her ear lobes, and such ugly earrings in them! And she could smell the betel nut the woman was chewing and see the betel juice that was threatening to spill over her lips at any moment. Ugh! — who could be sociable with such a person? “Yes, I’m travelling alone,” she answered curtly. “And I’ve got a ticket too.” “Yes, she’s on her way to town,” said the conductor. “With a thirty-paise ticket.” But the old woman went on with her drivel. “Is it proper for such a young person to travel alone? Do you know exactly where you’re going in town? What’s the street? What’s the house number?” “You needn’t bother about me.

- (i) “Valli found the woman absolutely repulsive”. What do you mean by “repulsive”? 1
- Causing strong dislike
 - Showing displeasure
 - Attractive
 - Admirable
- (ii) Valli told the conductor to mind his own business and laughed as well. This shows that Valli... 1
- Was not bothered about what the conductor said.
 - Didn’t like the conductor speaking about her.
 - Disliked what the conductor said but was amused.
 - Was impressed with what the conductor said.
- (iii) The old woman went on with her drivel. Why is the word ‘drivel’ used here? It is used to show that the old woman: 1
- Was talking non-stop.
 - Kept muttering a lot of nonsense.
 - Was giving advice on request.
 - Spoke non-stop about herself.
- (iv) Describe Valli’s reaction to the elderly woman’s questions and appearance in about 40 words. 2

The Sermon at Benares

- Through ‘The Sermon at Benares’, the Buddha preached that death is inevitable and we need to overcome the suffering and pain that follows. Based on your reading of the lesson, write how one should cope with the death of a loved one. (2 M or 4 M) (2019, 2015)
- What lesson on death and suffering did the Buddha teach Kisa Gotami in the chapter, ‘The Sermon at Benares’? (2 M or 8 M) (2020, 2018, 2015)
- What did Kisa Gotami do after the death of her only son? (2 M or 3 M) (2023, 2022)

Competency Based Questions

- ‘As ripe fruits are in danger of falling early, so mortals when born are always in danger of death’. With the statement of the Buddha find out the moral values that Kisa Gotami learnt after the death of her child. (6 M) (2023, 2022, 2016, 2014)
 - Both the texts, ‘For Anne Gregory’ and ‘The Sermon at Benares,’ grapple with the idea that external attributes are fleeting and subject to decay. Examine the similarities. (6 M)
 - Read the following extract and answer the questions/complete the sentences that follow: (3 M)
- Buddha said, “The life of mortals in this world is troubled and brief and combined with pain. For there is not any means by which those that have been born can avoid dying after reaching old age there is death; of such a nature are living beings. As ripe fruits are early in danger of falling, so mortals, when born, are always in danger of death. As all earthen vessels made by the Potter end in being broken, so is the life of mortals. Both young and adult, both those who are fools and those who are wise, all fall, into the power of death, all are subject to death.”
- ‘As all earthen vessels made by the Potter end in being broken’, what is the meaning of this line by Buddha? 1
 - Life of the mortal ultimately fall in happiness.
 - Life of the mortal ultimately fall in death.
 - Life of the immortal ultimately fall in death.
 - There is no life in the mortal world.
 - According to the passage, could both young and adults who are wise be saved from death? 1
 - Yes they could be saved because they are wise.
 - No they couldn’t be saved.
 - Only young could be saved.
 - Only adults could be saved.
 - Based on the passage, what can be inferred about the inevitability of death in the life of mortals? 1
 - Why does the Buddha compare the life of mortals to ripe fruits and earthen vessels made by a Potter? 2

The Proposal

- Russian society emerges as an important character in the play, ‘The Proposal’. Support your answer giving instances. (4 M) (2022)
- Why does Chubukov suspect Lomov when he comes to his house? (2 M) (2016)

3. How did Chubukov react when Lomov asked for the hand of his daughter in marriage? (2 M or 3 M) (2023, 2022)

4. Chekov has used humour and exaggeration in the play to comment on courtship in his times. Illustrate with examples from the lesson, 'The Proposal.' Also mention the values, you think, any healthy relationship requires. (4 M) (2016, 2015)

Competency Based Questions

5. You have been chosen to address a students gathering about the characters Natalya and Lomov who lose their temper on trivial issues. It shows their poor skills at anger management. Suggest some ways that help you in maintaining cordial relationships with people around you. (6 M)

6. The characters Natalya and Lomov lose their temper on unimportant issues. What does it show and which skill they both are required to have? Suggest some ways that help you in maintaining good and healthy relationships with people around you. (6 M)

7. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

Lomov: But you can see from the documents, honoured Natalya Stepanovna. Oxen Meadows, its true were once the subject of dispute, but now everybody knows they are mine. There's nothing to argue about. You see my aunts grandmother gave the free use of these Meadows in perpetuity to the peasants of your father's grandfather, in return for which they were to make bricks for her. The peasants belonging to your father's grandfather had the free use of Meadows for forty years, and had got into the habit of regarding them as their own, when it happened that.....

Natalya: No, it isn't at all like that! Both grandfather and great grandfather reckoned that their land extended to Burnt Marsh -which means Oxen Meadows were ours. I don't see what there is to argue about, its simply silly. (CBSE, 2023)

(i) The subject of dispute was regarding 1

- (a) free use of Meadows
- (b) making of bricks
- (c) peasants using Meadows
- (d) ownership of Meadows

(ii) Find the word from the extract which means 'continuance': 1

- (a) dispute
- (b) perpetuity
- (c) belonging
- (d) reckoned

(iii) Lomov's aunt's grandmother gave Oxen Meadows to Natalya's father's grandfather in lieu of 1

(iv) According to Natalya why did Oxen Meadows belong to them? 1

(v) Fill in the blank with ONE WORD only: 1
The peasants had free use of Meadows for years,

FIRST FLIGHT: POETRY

Dust of Snow

1. You have been asked to present an evaluation of the role that nature plays in positively impacting the lives of individuals in the chapters "Coorg" and "Dust of Snow." Write this presentation draft including your insights, in about 120 words, comparing how nature serves as a source of inspiration or transformation in both chapters. (6 M)

Competency Based Questions

2. A simple moment proves to be very significant and saves the rest of the day of the poet from being wasted. Explain on the basis of the poem 'Dust of Snow'. (6 M)

3. Discuss the impact of nature and its transformative power as depicted in the poem extract. Explore how the crow and the dust of snow symbolize nature's influence on the speaker's emotions and their perception of the world around them. (6 M)

4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

The way a crow
Shook down on me
The dust of snow
From a hemlock tree
Has given my heart
A change of mood
And saved some part
Of a day I had rued
(Dust of Snow)

(i) What is the poet's state of mind in the extract? 1

- (a) Depressed
- (b) Sad
- (c) Hopeless
- (d) Blissful

(ii) How did the crow change the poet's mood? 2

(iii) Complete the following analogy: 1

hook : tremble :: lament : _____

(iv) Select the sentence in which the word 'change' is used in the similar manner as line 6 of the extract. 1

- (a) There was sudden change in the weather.
- (b) I think you should change your clothes.
- (c) He changed from pessimist to an optimist.
- (d) The fisherman has changed their hunting area.

Fire and Ice

1. Fire and Ice projects a pessimistic outlook. Comment. (CBSE, QB)

Competency Based Questions

2. The author presents two reasons which will lead to the destruction of human quality. What values do you garner from the 2 possible reasons provided by him? (6 M)
3. How does Robert Frost use figurative language in "Fire and Ice" to convey the theme of destructive passion? (6 M)
4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

*But if it had to perish twice
I think I know enough of hate
To say that for destruction ice*

*Is also great
And would suffice* (5 M) (SQP-2023)

- (i) What does 'It' here refer to? 1
(a) Fire (b) Ice
(c) Earth (d) World
- (ii) Identify the most likely tone of the poet in the lines- 'To say that for destruction ice/Is also great'. 1
(a) Serious (b) Sarcastic
(c) Amused (d) Informative
- (iii) The two things that the poet thinks are good enough for destruction are: 1
(a) Fire and ice, which stands for 'hatred' and 'desire'.
(b) Fire and ice, which stands for heat and glaciers.
(c) Fire and ice, which stands for anger and patience.
(d) The cold attitude and anger of people.
- (iv) What does the speaker mean by saying, "But if it had to perish twice"? How does the speaker perceive the destructive power of ice? 2

A Tiger in the Zoo

Competency Based Questions

1. Love for freedom is the natural instinct of every living being. Comment. (6 M)
2. Is it right to confine wild animals into cages and take their freedom? Why or why not? (6 M)
3. Read the following extract and answer the questions that follow: (5 M) (2024, 2023, 2016)

*He stalks in his vivid stripes
The few steps of his cage,
On pads of velvet quiet,
In his quiet rage,
He should be lurking in shadow,
Sliding through long grass
Near the water hole
Where plump deer pass.*

- (i) 'Quiet rage' refers to the tigers
(a) helplessness
(b) he has not been able to hunt
(c) his prey has not come to the water hole
(d) he is not free
- (ii) He is lurking in the shadows because
- (iii) Complete the sentence appropriately:
It is clear that metaphor is the poetic device used for 'pads of velvet' because
(clue-explain how metaphor applies here).
- (iv) Find a word from the extract which means- to walk with measured, stiff or haughty strides:
(a) steps (b) lurking
(c) pads (d) stalk
- (v) State whether the following statement is TRUE or FALSE:
The tiger is stealthily waiting for the deer to come to the water hole.
4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)
- He hears the last voice at night,
The patrolling cars,
And stares with his brilliant eyes
At the brilliant stars.
(A Tiger in the Zoo)
- (i) What is the contrast between the "last voice" and the "brilliant stars" in the poem? 1
(a) The last voice represents captivity, while the stars represent freedom.
(b) The last voice symbolizes danger, while the stars symbolize tranquility.
(c) The last voice signifies human presence, while the stars signify the natural world.
(d) The last voice signifies confinement, while the stars signify vastness and wonder.

(ii) What does the mention of the patrolling cars suggest? 1

- (a) The presence of danger
- (b) The disruption of peace
- (c) The control over the tiger's environment
- (d) The absence of danger

(iii) How does the poet's use of the phrase "brilliant eyes" contribute to the theme of the poem? Elaborate. 2

(iv) Which word can substitute 'brilliant' in the following phrase:

And stares with his _____ (natural/glistening/amazing) eyes. 1

How to Tell Wild Animals

1. You have been asked to present an evaluation of the contrasting lifestyles in 'Glimpses of India' and the humor in 'How to Tell Wild Animals'. Write this presentation draft, including your insights, in about 120-130 words, comparing these two very different pieces. (6 M)

Competency Based Questions

2. How does the poem "How to tell wild Animals" by Carolyn Wells use humorous exaggeration and absurdity to not only entertain but also convey a deeper message about human perception and the inherent wildness within all of us? (6 M)

3. The poet has successfully used humour to be able to 'tell' or identify 'wild animals'. How do you think we need lots of it in our daily life? (6 M)

4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

Though to distinguish beasts of prey

A novice might nonplus,

The Crocodile you always may Tell

from the Hyena thus:

Hyenas come with merry smiles;

But if they weep they're Crocodiles.

(i) Choose the option that DOES NOT describe a 'novice'. 1

- (a) Lakshman has played cricket for the first time today.
- (b) Samiksha has been teaching for the last ten years.
- (c) Srishti went for her first French class yesterday.
- (d) Gautam baked a second cake to improve his skills.

(ii) Where does a novice may get confused? 1

- (a) In differentiating between hyenas and crocodiles.
- (b) In differentiating leopard and tiger.
- (c) Both (a) and (b).
- (d) None of the above.

(iii) What, according to the extract, would cause bewilderment? 1

(a) Discovering the similarity between different prey of beasts.

(b) Analyzing habits of beasts that prey on hyenas.

(c) Knowing the difference between several beasts of prey.

(d) Drawing the similarities between crocodiles and hyenas.

(iv) Explore the use of imagery and descriptive language in the poem. How does it enhance the reader's experience? 2

The Ball Poem

1. Why does the poet not offer the boy money to buy another ball? (2 M) (2020, 2018)

2. You have been invited to speak at a community gathering about the themes of loss and acceptance depicted in "The Sermon at Benares" and "The Ball Poem." Prepare your speech draft in not more than 120 words, elaborating on how both works offer insights into dealing with loss and moving forward in life. (6 M)

Competency Based Questions

3. 'Loss is an important part of life'. How is this idea explored in 'The Ball Poem'? (6 M)

4. "Losses after losses be lifted and losses after losses be left behind. Losses are a part of our inseparable life. We cannot isolate them." Comment on this statement. (6 M)

5. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

A dime, another ball, is worthless. Now

He senses first responsibility

In a world of possessions. People will take

Balls, balls will be lost always, little boy.

(The Ball Poem)

(i) Fill in the Blank 1

When the speaker mentions 'possessions', he is referring to the world of _____.

(ii) What does the poet imply by saying 'Balls, balls will be lost always, little boy'? 1

(iii) Which theme is most evident in the poem? 1

- (a) Loss (b) Responsibility
- (c) Childhood (d) Possessions

(iv) Comment on the poet's use of repetition in the given lines. 2

Amanda!

1. 'Amanda is alone but not lonely in the world she envisions.' Give instances from the poem to justify. (2 M or 3 M) (2024, 2022)

2. Amanda was blamed for a number of things. Mention any two. (2 M) (2022)

3. Why does Amanda wish to be a mermaid? (3 M) (2023)

4. Present an evaluation of the character development in both "His First Flight" and "Amanda." Compare and contrast the growth and transformation of the main characters in both stories, focusing on their aspirations, challenges faced, and the impact of their experiences on their personal development. Write this presentation draft, including your insights, in about 120 words. (6 M)

You may begin this way:

One acknowledges that both "His First Flight" and "Amanda" showcase the journey of their main characters, highlighting their aspirations and the obstacles encountered along the way.

Competency Based Questions

5. State the key points in the poem Amanda. What do you learn from it? (6 M)

6. "Don't bite your nails, Amanda!

Don't hunch your shoulders, Amanda!"

Amanda's parents were over-anxious about her. She often found their instructions very stifling. Reading the poem and based on Amanda's experience, write a paragraph on the topic "Should parents be allowed to control children?" (6 M)

7. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

Stop that sulking at once, Amanda!

You're always so moody, Amanda!

Anyone would think that I nagged at you, Amanda!

(Amanda!)

- (i) State the word similar in meaning to the word 'sulking' from the extract above. 1
- (ii) What does the speaker imply by saying 'Stop that sulking at once, Amanda!?' 1
- (iii) What is the dominant emotion expressed by the speaker in these lines? 1
 - (a) Joy
 - (b) Indifference
 - (c) Frustration
 - (d) Excitement
- (iv) Comment on the speaker's use of repetition in the given lines. 2

The Trees

1. What is the central idea of the poem 'The Trees'? (6 M)

Competency Based Questions

2. You have been invited to speak at a community gathering about the universal lessons that can be learned from "The Sermon at Benares" and "The Trees". Prepare a speech draft in not more than 120 words, highlighting the shared themes of change and acceptance in these two pieces. (6 M)

3. You have been chosen to address a student gathering from the neighbourhood schools, to speak on the resilience of human spirit required to transcend discrimination. Prepare the speech draft in not more than 120 words, with reference to the commonality of themes in Nelson Mandela: Long Walk to Freedom and The Trees by Adrienne Rich. (6 M) (SQP-2023)

You may begin this way:

Good morning, everyone. Today, I'd like to discuss two pieces of literature that offer a powerful insight into the resilience of the human spirit required to transcend discrimination.

You may end this way.

To conclude, I'd like to say that ...

Thank you

4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

All night the roots work

to disengage themselves from the cracks
in the veranda floor.

The leaves strain toward the glass

small twigs stiff with exertion

long-cramped boughs shuffling under the roof

like newly discharged patients

half-dazed, moving

to the clinic doors.

(The Trees)

- (i) How does the language in the poem deviate from conventional poetic expressions? 1
- (ii) What is the significance of the word "exertion" in the poem, and how does it shape the poem's overall mood and tone? Answer in about 40 words. 2
- (iii) Based on the content of the poem, what is the overall mood or atmosphere portrayed? 1
 - (a) Joyful
 - (b) Melancholic
 - (c) Serene
 - (d) Energetic
- (iv) Which literary device is predominantly used in the poem to convey its central theme? 1

Fog

1. You have been asked to evaluate the contrasting roles of guidance and intuition in "Black Aeroplane" and "Fog," specifically focusing on the pilot in "Black Aeroplane" and the metaphorical fog in Carl Sandburg's "Fog." How do these elements help or hinder the characters' journey? Write this evaluation draft, including your insights, in about 120 words. (6 M)

Competency Based Questions

2. The poet has a unique point of view on a natural phenomenon. Discuss with reference to 'The Fog'. (6 M)
3. What metaphor has the poet used in the poem 'Fog'? Do you think it is appropriate? (6 M)
4. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

The fog comes
on little cat feet.
It sits looking
over harbour and city
on silent haunches
and then moves on

(Fog)

- (i) How does the language in the poem deviate from conventional poetic expressions? 1
- (ii) What is the significance of the word "fog" in the poem, and how does it shape the poem's overall mood and tone? Answer in about 40 words. 2
- (iii) Complete the sentence with the appropriate option. 1
The lines from the poem tell us that the city is _____.
(a) bustling (b) crowded
(c) peaceful (d) modern
- (iv) Which literary device is predominantly used in the poem to convey its central theme? 1

The Tale of Custard the Dragon

1. Describe how Custard the dragon fights with the Pirate. (2 M or 3 M) (2023, 2022)
2. How would you describe Custard the Dragon? (3 M) (2024, SPQ-2023, 2022)

Competency Based Questions

3. How does the poet use irony in the poem, 'The Tale of the Custard Dragon'? (6 M)

4. How was Belinda's behavior with the dragon? Why was the dragon called Percival by the other pets? (6 M) (CBSE, 2022)

5. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

Suddenly, suddenly they heard a nasty sound,
and Mustard growled, and they all looked around.
Meowch! cried Ink, and ooh! cried Belinda,
For there was a pirate, climbing in the winda.
Pistol in his left hand, pistol in his right,
and he held in his teeth a cutlass bright,
His beard was black, one leg was wood;
It was clear that the pirate meant no good.

(The Tale of Custard the Dragon)

- (i) How does the language in the poem deviate from conventional poetic expressions? 1
- (ii) What is the significance of the word "nasty" in the poem, and how does it shape the poem's overall mood and tone? Answer in about 40 words. 2
- (iii) The poem suggests that the setting is _____. 1
(a) a peaceful village (b) a house
(c) a pirate ship (d) a haunted castle
- (iv) Which literary device is predominantly used in the poem to convey its central theme? 1

For Anne Gregory

1. The poet in the poem, 'For Anne Gregory' conveys that we should give importance to the inner beauty and not to the physical appearance. Elaborate with reference to the poem. (3 M or 8 M) (2024, 2019)

Competency Based Questions

2. You have been invited to give a talk about the themes of independence and self-realization in young individuals. Create your speech draft in not more than 120 words, comparing Valli's journey in "Madam Rides the Bus" and the message conveyed in the poem "For Anne Gregory." (6 M)
3. You have been asked to present an evaluation of the themes of both "Madam Rides the Bus" and "For Anne Gregory" towards the concept of identity and self-expression. Write this presentation draft including your insights, in about 120 words, comparing the themes of both.

You may begin this way: One acknowledges that both "Madam Rides the Bus" and "For Anne Gregory" explore the concept of identity and self-expression; however, ...

(Reference - "Madam Rides the Bus" & "For Anne Gregory") (6 M)

4. Read the following extract and answer the questions/ complete the sentences that follow: (5 M)

*"I heard an old religious man
But yesternight declare
That he had found a text to prove
That only God, my dear,
Could love you for yourself alone
And not your yellow hair."*

- (i) According to the religious man, who is capable of loving someone for themselves alone? 1
- Young men in despair.
 - God
 - People with yellow hair.
 - The speaker of the poem.
- (ii) What is the religious man's view on love? 1
- Love should be based on physical appearance.
 - Love should be conditional.
 - Only God is capable of true love.
 - Love is irrelevant and superficial.
- (iii) What does the mention of the religious man imply about societal standards of love? 1
- Society values physical beauty above all else.
 - Society's standards of love are flawed.
 - Love should be based on external factors.
 - Religious views have no impact on love.
- (iv) What role does the mention of the religious man and his belief about God's love play in the poem's exploration of true love and personal worth? 2

FOOTPRINTS WITHOUT FEET

A Triumph of Surgery

- How did Mrs. Pumphrey treat Tricki? (2 M or 3 M) (2023, 2019)
- What excuses did Mrs. Pumphrey make about Mr. Herriot's advice? (3 M or 6 M) (SQP- 2023, APQ- 2023, 2023)

Competency Based Questions

- Imagine that Mrs. Pumphrey from A Triumph of Surgery, reflects upon her behaviour, learns from her mistakes, and writes a diary entry about the consequences of overindulgence. Write this diary entry as Mrs. Pumphrey in about 120 words. (6 M) (CBSE APQ, 2023)

4. Evaluate how James Herriot's characterisation contributes significantly to the overarching theme of responsible pet ownership and animal welfare. (6 M)

5. Read the following extract and answer the questions/ complete the sentences that follow: (5 M)

'And did you cut down on the sweet stuff as I told you to?'. Oh, I did for a bit, but he seemed to be so weak I had to relent. He does love cream cakes and chocolates. I can't bear to refuse him.'

- (i) Why does the speaker ask if the sweet things have been cut down? 1
- As it was ruining Tricki's health.
 - As it was ruining Tricki's teeth.
 - As Tricki's mistress loved sweet things.
 - None of the above.
- (ii) What does the term "cut down" mean? 1
- (iii) These lines are written by _____. 1
- (iv) How does the speaker's reluctance to refuse the indulgence of sweet treats to the person being referred to reflect their approach towards their well-being? 2

The Thief's Story

- In which queer way did Anil make a living? (2 M) (2020, 2018)
- Why did Hari Singh smile in his most appealing way towards the end of the story? (2 M or 3 M or 6 M) (SQP- 2023, 2023, 2020)
- Trust and compassion can reform a person. Justify this statement in the light of the lesson 'The Thief's Story'. (6 M) (2024, 2023)

Competency Based Questions

- Why do people like Hari Singh win the confidence of others and make friends with them? Was Hari Singh able to do the same? (6 M)
 - Trust and compassion can reform a person. Justify this statement in the light of the lesson 'The Thief's Story'. (6 M) (CBSE, 2023)
 - Read the following extract and answer the questions/ complete the sentences that follow: (5 M)
- Anil was asleep. A beam of moonlight stepped over the balcony and fell on the bed. I sat up on the floor, considering the situation. If I took the money, I could catch the 10.30 Express to Lucknow. Slipping out of the blanket, I crept up to the bed. Anil was sleeping peacefully. His face was clear and unlined; even I had more marks on my face, though mine were mostly scars.

What does the narrator's choice to sit up on the floor imply about the situation? **1**

- (a) The narrator is uncomfortable and uncertain about what to do.
- (b) The narrator is planning a surprise for Anil when he wakes up.
- (c) The narrator prefers sleeping on the floor rather than the bed.
- (d) The narrator is preparing to confront Anil about the stolen money.

(ii) Why does the narrator consider taking the money while Anil is asleep? **1**

- (a) The narrator wants to teach Anil a lesson for not paying him.
- (b) The narrator intends to use the money to buy food for both of them.
- (c) The narrator plans to escape and start a new life in Lucknow.
- (d) The narrator wants to prove that he can successfully steal without being noticed.

(iii) Based on the passage, what can be inferred about the narrator's past experiences? **1**

- (iv) Analyze the internal conflict faced by the narrator when considering stealing the money. How does this conflict highlight the moral dilemma and the narrator's desire for a fresh start? **2**

The Midnight Visitor

1. How did Ausable get rid of Max without using a weapon. **(6 M) (2023)**

2. How did Max enter Ausable's room? **(2 M) (2016, 2015)**

3. Imagine that Ausable, from "The Midnight Visitor" by Robert Arthur, writes a diary entry reflecting on the themes of deception, intelligence, and the unexpected facets of spy craft in the context of his recent experience with Fowler and Max. Write this diary entry, as Ausable, in about 120 words. **(6 M)**

Competency Based Questions

4. How does Ausable's unassuming appearance and demeanor serve as an advantage in his line of work as a spy? **(6 M)**

5. In "The Midnight Visitor" by Robert Arthur, how does the character of Ausable undergo development throughout the story? Discuss the changes he experiences and how these affect the unfolding of events, in about 120 words. **(6 M)**

6. Read the following extract and answer the questions/complete the sentences that follow! **(5 M)**

Ausable did not fit any description of a secret agent Fowler had ever read. Following him down the musty corridor of the gloomy French hotel where Ausable had a room, Fowler felt let down. It was a small room, on the sixth and top floor, and scarcely a setting for a romantic adventure.

Ausable was, for one thing, fat. Very fat. And then there was his accent. Though he spoke French and German passably, he had never altogether lost the American accent he had brought to Paris from Boston twenty years ago. "You are disappointed," Ausable said wheezily over his shoulder. "You were told that I was a secret agent, a spy, dealing in espionage and danger. You wished to meet me because you are a writer, young and romantic. You envisioned mysterious figures in the night, the crack of pistols, drugs in the wine." **(The Midnight Visitor)**

(i) Which of these describes how Fowler felt at the beginning of the extract? **1**

- (a) His heart sank.
- (b) He was shaken up.
- (c) His stomach was in knots.
- (d) He was at the end of his rope.

(ii) State one observation about Ausable based on the way he handled Fowler's disappointment with him. **1**

(iii) How did the atmosphere of the French hotel influence Fowler's mood? Answer in 40 words. **2**

(iv) Which of these means the same as 'romantic' in the line below? **1**

It was a small room, on the sixth and top floor, and scarcely a setting for a romantic adventure.

- (a) great
- (b) exciting
- (c) idealistic
- (d) passionate

A Question of Trust

1. On the basis of story 'A Question of Trust' what suggestions would you give to your friend who is going to his grandfather's house during summer vacations so that any clever thief like Horace Danby may not enter his house to steal in his absence. **(2 M or 4 M) (2016, 2015)**

2. Describe how Horace Danby plan his work? **(2 M or 4 M) (2018, 2016)**

3. How can you say that Horace Danby was good and respectable but not completely honest? **(2 M) (2019, 2018)**

Competency Based Questions

4. Horace Danby represents people who take the wrong ways to fulfill their wishes. What values would you like such people to adopt to reform themselves? (6 M)
5. What does the story reveal about the human tendency to manipulate systems for personal gain? (6 M)
6. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

It was a quiet, kindly voice, but one with firmness in it. A woman was standing in the doorway, and Sherry was rubbing against her. She was young, quite pretty, and was dressed in red. She walked to the fireplace and straightened the ornaments there. "Down, Sherry," she said. "Anyone would think I'd been away for a month!" She smiled at Horace, and went on, "However, I came back just in time, though I didn't expect to meet a burglar."

(A Question of Trust)

- (i) Which of the following is NOT mentioned about the woman in the paragraph? 1
 - (a) She has a firm voice.
 - (b) She is dressed in blue.
 - (c) She is quite pretty.
 - (d) She has a pet named Sherry.
- (ii) Why does the woman's statement, "Anyone would think I'd been away for a month!" seem ironic? Answer in about 40 words. 2
- (iii) Which of the following best describes the extract: 1
 - (a) A narrative description of a character and setting.
 - (b) A monologue where the character expresses her surprise.
 - (c) A dialogue between two characters discussing their plans.
- (iv) If this extract were to be performed on stage, how should the actress playing the woman emphasize the word "burglar" to convey her surprise? 1

Footprints Without Feet

1. A brilliant scientist though he was, Griffin misused his scientific discovery. Illustrate this point by giving any two examples from the story. (2 M or 8 M) (2020, 2019)
2. Discoveries of science can be used for the welfare of mankind as well as for its destruction. How is this applicable to Griffin's scientific discovery? Explain giving examples from the text. (100-120 words) (3 M or 6 M) (2024, APQ - 2023)

Competency Based Questions

3. Did Griffin from Footprints without Feet follow the saying 'with great power comes great responsibility'? Justify your answer. (6 M)
 4. A character arc is the transformation or development of a character throughout a story and refers to the changes a character undergoes as a result of their experiences, challenges, and interactions with other characters. In the light of the above information, trace the character arc of Mathilda Loisel in the chapter 'The Necklace' from 'Footprints without Feet,' in about 120 words. (6 M)
 5. Read the following extract and answer the questions/complete the sentences that follow: (5 M)
- Brilliant scientist though he was, Griffin was rather a lawless person. His landlord disliked him and tried to eject him. In revenge Griffin set fire to the house. To get away without being seen he had to remove his clothes. Thus it was that he became a homeless wanderer, without clothes, without money, and quite invisible — until he happened to step in some mud, and left footprints as he walked!
- (i) What caused Griffin to become visible again? 1
 - (a) A sudden gust of wind.
 - (b) Rainfall.
 - (c) Sunlight reflecting off a surface.
 - (d) Stepping in mud and leaving footprints.
 - (ii) What can be inferred about Griffin's character based on his actions? 2
 - (iii) "Lawless" means _____. 1
 - (iv) (A) Griffin was stupid to remove his clothes to become invisible in December Chilly winds. 1
 - (B) Griffin was a brilliant scientist.
 - (a) (A) is right (B) is wrong.
 - (b) (A) is wrong (B) is right.
 - (c) Both are right.
 - (d) Both are wrong.

The Making of A Scientist

1. 'A parent should try to be a companion to a child.' Explain with reference to Richard's mother. (2 M or 8 M) (2022, 2020, 2017)
2. What role did Ebright's mother play in his success? (2 M) (2022, 2020, 2017)
3. Why did Richard Ebright raise a flock of butterflies? (2 M) (2023, 2014)

Competency Based Questions

- Discuss the statement 'Failure is the pillar of success'. Use suitable examples from the story to support your argument. (6 M)
- Validate the importance of small, fun learning tasks which make successful careers, in the context of Richard Ebright in 'The making of a scientist'. (6 M)
- Read the following extract and answer the questions/complete the sentences that follow: (5 M)

Richard Ebright has been interested in science since he first began collecting butterflies - but not so deeply that he hasn't time for other interests. Ebright also became a champion debater and public speaker and a good canoeist and all-around outdoors-person. He is also an expert photographer, particularly of nature and scientific exhibits.

- What is one of Richard Ebright's hobbies besides science? 1
 - Collecting butterflies
 - Playing chess
 - Writing poetry
 - Cooking gourmet meals
- Based on the passage, what can be inferred about Richard Ebright's diverse skills and interests? 1
- Write 'one word' from the passage for 'a person who is skilled in canoeing'. 1
- How might Richard Ebright's diverse skills and interests outside of science contribute to his scientific endeavours? 2

The Necklace

- Why was Matilda unhappy in her early married life? (2 M) (2020, 2017, 2016)
- As a reader do you sympathies with Matilda? Give reasons from the text to support your answer. (2 M) (2022, 2016)
- Why did Matilda (Mme Loisel) leave the ball in a hurry? What does it show about her character? (2 M) (2018, 2014)
- Matilda was very proud of her beauty and charm and this led to her downfall. Elaborate. (2 M or 6 M) (2023, 2017)
- Contentment in one's life is very important to lead a peaceful life. We should be happy with what we have and should not crave for what we don't have. Matilda suffered in life because she was not content in her life. Her desires led to her disaster. What do you learn from her mistake in life? (6 M or 8 M) (2023, 2022, 2020, 2015)

Competency Based Questions

- Imagine that M. Loisel, from The Necklace by Guy de Maupassant, writes a diary entry, exploring the theme of class and social status, and the nature of social mobility, in the context of his own experience. Write this diary entry, as M. Loisel, in about 120 words. (6 M) (CBSE SQP, 2023)
- Was Madame Forestier a true friend of the Loiseles? Use examples from the story to elaborate. (6 M)
- Read the following extract and answer the questions/complete the sentences that follow: (5 M)

She was not convinced. "No", she replied, "there is nothing more humiliating than to have a shabby air in the midst of rich women." Then her husband cried out, "How stupid we are! Go and find your friend Mme Forestier and ask her to lend you her jewels." She uttered a cry of joy. "It is true!" she said. "I had not thought of that."

- What was the woman's initial reaction upon hearing her husband's suggestion? 1
 - Indifference
 - Disgust
 - Joy
 - Confusion
- What does the word "shabby" mean as used in the passage? 1
 - Dirty or untidy in appearance.
 - Expensive and luxurious.
 - Exquisite or beautiful.
 - Refined and elegant.
- What can be inferred about the woman's state of mind after her husband's suggestion? 1
- Analyze the significance of the woman's statement, "there is nothing more humiliating than to have a shabby air in the midst of rich women." How does it reflect her perception of social status? 2

Bholi

- "Put the fear out of your heart and you will be able to speak like anyone else." These words of encouragement from the teacher highlight that change of social attitude and encouragement can help a child like Bholi to become confident and face the world bravely. Taking help from the lesson, 'Bholi' write how the social attitude towards Bholi made her an introvert. What should be done to help such children to face the world bravely? (4 M or 8 M) (2019, 2015)
- Why did Bholi dislike Bishamber? (2 M) (2020, 2015)
- School education turned Bholi from a dumb cow into a bold girl. How did she save her father from a huge expense and become his support in his old age? (3 M or 4 M) (SQP-2023, 2017, 2016)

4. It was education which made Bholi bold enough to say 'No' to Bishamber when he demanded five thousand rupees as dowry. Comment.

(2 M or 8 M) (2019, 2017, 2015)

5. Destiny had been cruel to Bholi yet she made a place for herself in a conservative society. Discuss.

(3 M or 6 M) (2024, 2023)

Competency Based Questions

6. Education provides the required stimulus to overcome one's personal barriers and explain the role of education in shaping the life of a child with respect to the lesson 'Bholi'. (6 M)
7. In the chapter 'Bholi,' explore the theme of self-acceptance and the power of inner strength. Discuss how Bholi's journey from insecurity to self-confidence highlights the transformative nature of self-acceptance. Support your answer with relevant examples from the chapter, emphasizing key moments that showcase Bholi's growth and the impact of her inner strength on her life. Write your response in about 120 words. (6 M)

8. Read the following extract and answer the questions/complete the sentences that follow: (5 M)

The flames of the sacred fire slowly died down. Everyone was gone. Ramlal turned to Bholi and said, "But what about you, no one will ever marry you now. What shall we do with you?" And Sulekha said in a voice that was calm and steady, "Don't you worry, Pitaji! In your old age I will serve you and Mother and I will teach in the same school where I learnt so much. Isn't that right, Ma'am?" The teacher had all along stood in a corner, watching the drama. "Yes, Bholi, of course," she replied. And in her smiling eyes was the light of a deep satisfaction that an artist feels when contemplating the completion of her Masterpiece. (Bholi)

- (i) What is the tone of Ramlal's words in the line, "But what about you, no one will ever marry you now"? 1
(a) worried (b) hopeful
(c) supportive (d) indifferent
- (ii) How does the author's use of Sulekha's perspective help build the narrative in the extract? 2
- (iii) Fill in the blank with the correct word from the bracket: 1
The word 'Masterpiece' in the line '...the completion of her Masterpiece' indicates that the teacher sees Bholi as her greatest _____ (achievement / responsibility).
- (iv) How does Sulekha's calm response contrast with Ramlal's feelings in the passage? 1

The Book that Saved the Earth

1. How did the book change Think-Tank's opinion about the Earthlings? (2 M) (2016, 2015, 2014)
2. It is morally incorrect to invade another country/planet for one's own benefit. The Martians did not understand the value of peaceful coexistence. How did the book of nursery rhymes save the Earth from the Martian invasion? (3 M or 6 M) (2024, 2016)
3. How did the people on the earth help the Martian people? How did this effort help the people on both the planets? (2 M or 8 M) (2020, 2019)

Competency Based Questions

4. Compare and contrast the characters of Noodle and Think-Tank. (6 M)
5. Trace the character arc of Think-Tank in "The Book That Saved The Earth," focusing on his shift from arrogance to humility, in about 120 words. (6 M)
6. Read the following extract and answer the questions/complete the sentences that follow: (5 M)
- HISTORIAN:** (chuckling) And that's how one dusty old book of nursery rhymes saved the world from a Martian invasion. As you all know, in the twenty-fifth century, five hundred years after all this happened, we Earthlings resumed contact with Mars, and we even became very friendly with the Martians. By that time, Great and Mighty Think: Tank had been replaced by a very clever Martian – the wise and wonderful Noodle!
- (i) Who succeeded Great and Mighty Think-Tank in Martian leadership according to the historian? 1
(a) A book of military strategies.
(b) A manual on diplomacy.
(c) A book of nursery rhymes.
(d) A collection of Martian laws.
- (ii) What is the significance of the "twenty-fifth century" in the context of Earth-Martian relations? 1
- (iii) From the historian's chuckle, what can we infer about the perception of nursery rhymes in saving the world? 1
- (iv) Discuss the transition in Martian leadership from Great and Mighty Think-Tank to Noodle and its implications for understanding leadership qualities. 1

SAMPLE PAPERS



Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER

(SCIENCE)

Time allowed : 3 hours

Maximum Marks : 80

GENERAL INSTRUCTIONS:

- (i) This question paper consists of 39 questions. All questions are compulsory.
- (ii) This question paper is divided into five sections - A, B, C, D and E.
- (iii) There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for the incorrect response.

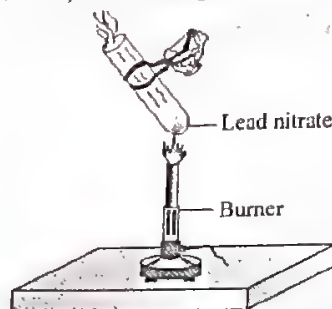
1. In a laboratory experiment, a student is given a sample of an unknown element and is asked to determine its identity. The student observes that the element has a high melting point, is a good conductor of electricity, and forms a basic oxide when reacted with oxygen.
Based on these observations, the student proposes two possible identities for the unknown element: it could be metal 'X' or metal 'Y'. Which identity, if any, is more likely, and why? 1
 - (a) Metal 'X' is more likely because it has a higher melting point than metal 'Y.'
 - (b) Metal 'Y' is more likely because it forms a basic oxide, which is a characteristic of metals.
 - (c) Both metal 'X' and metal 'Y' are equally likely, and the observations do not provide sufficient information to distinguish between them.
 - (d) Neither metal 'X' nor metal 'Y' is likely because the observations are inconsistent.
2. You are participating in a baking competition, and you've been given a recipe that requires the use of baking powder. To ensure your cake rises perfectly, you reach for a container labeled "baking powder" and check the list of constituents. Which of the following pairs of constituents should you expect to find in the baking powder container for your cake recipe? 1
 - (a) Sodium hydrogen carbonate and tartaric acid
 - (b) Sodium hydroxide and hydrochloric acid
 - (c) Sodium hydrogen carbonate and hydrochloric acid
 - (d) Sodium hydroxide and tartaric acid
3. What is the oxidizing agent in the following redox reaction? 1

$$\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$$
 - (a) Cu
 - (b) AgNO_3
 - (c) $\text{Cu}(\text{NO}_3)_2$
 - (d) Ag
4. In a lab experiment, adding dilute hydrochloric acid to metal 'Y' produces a colorless gas. When a burning matchstick is brought near, it doesn't ignite. The reaction solution turns blue litmus paper red. Identify metal 'Y' among the options. 1
 - (a) Sodium
 - (b) Nitrogen
 - (c) Aluminum
 - (d) Carbon

5. Which of the following statements regarding carbon and its compounds is/are correct?

- (i) Isomerism is possible in organic compounds due to the tetravalency of carbon and different arrangements of its atoms.
 - (ii) Carbon forms compounds mainly by gaining electrons to complete its octet.
 - (iii) The unique property of carbon to form long chains, branched chains, and cycles is the basis for the vast diversity of organic compounds.
 - (iv) Carbon compounds exhibit basic properties.
- (a) (i) and (iii) (b) (ii) and (iv) (c) (i) and (iv) (d) (ii) and (iii)

6. In your chemistry class, the teacher demonstrates an experiment. They take some crystals of lead nitrate and heat them strongly in a dry test tube. As you observe the experiment, what change do you notice when the crystals of lead nitrate are heated?



- (a) Crystals immediately melt (b) White fumes will appear in the test tube
(c) A brown residue is left (d) A yellow residue is left

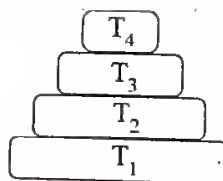
7. Which of the following pairs does NOT contain -CHO & -CO- functional groups respectively?

- (a) Butanal & pentanol (b) Pentanal and pentanone (c) Propanal & propanone (d) Butanal and butanone

8. In a population of asexually reproducing species, if a trait A exists in 10% of the population and a trait B exists in 60%, which trait is likely to have arisen earlier?

- (a) Trait A (b) Trait B
(c) Both traits arose simultaneously (d) cannot be determined

9. In the given figure the various trophic levels are represented in a pyramid. At which trophic level the energy available is maximum?



- (a) T_4 (b) T_2 (c) T_1 (d) T_3

10. The first step in photosynthesis is

- (a) Conversion of light energy to chemical energy (b) Reduction of carbon dioxide
(c) Absorption of light energy by chlorophyll (d) Formation of carbohydrates

11. Co-ordination is achieved through nervous system as well as endocrine system by respective agents like

- (a) Vitamins and proteins (b) Neurotransmitters and hormones
(c) Hormones and sugars (d) Sugar and hormones

12. While gardening, Riya accidentally gets a deep cut on her hand. What is the primary function of platelets in that case?

- (a) To fortify her immune response (b) To aid in oxygen delivery throughout her body
(c) To encourage the generation of white blood cells (d) To commence the blood clotting process at the wound site

13. A spherical mirror and a thin spherical lens each have a focal length of -15 cm. The mirror and the lens are likely to be

- (a) both concave (b) both convex
(c) the mirror is concave and the lens is convex. (d) the mirror is convex, but the lens is concave.

14. Which of the following is a property of a concave lens?

- (a) Converges light rays
- (c) Used to correct hypermetropia

- (b) Forms a real and inverted image
- (d) Causes dispersion of light

1

15. Consider the following statements:

- (i) Inaccuracies in DNA copying generate minor differences in asexual reproduction.
- (ii) Sexual reproduction results in clones of the parent organisms.
- (iii) Sexual reproduction involves the combination of genetic material from two parents.
- (iv) Greater diversity is generated through sexual reproduction compared to asexual reproduction.

The correct statements are:

- (a) (i) and (iii)

- (b) (ii) and (iv)

- (c) (i), (iii), and (iv)

- (d) (ii), (iii), and (iv)

1

16. Which of the following endocrine glands does not exist in pairs?

- (a) Testes

- (b) Adrenal

- (c) Pituitary

- (d) Ovary

For Q. Nos. 17 to 20, two statements are given- One labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

17. Assertion (A): $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above chemical equation is an example of displacement reaction.

Reason (R): Aluminium being more reactive than iron, displaces Fe from its oxide.

1

18. Assertion (A): Surgery for contraception, if not performed properly, can lead to infections.

Reason (R): Surgical methods of contraception are safer in the long run compared to other methods.

1

19. Assertion (A): Strength of an electromagnet depends on the magnitude of current flowing through it.

Reason (R): Electromagnets are mainly used to lift heavy weights.

1

20. Assertion (A): Artificial kidney is a device used to remove nitrogenous waste products from the blood through dialysis.

Reason (R): Reabsorption does not occur in artificial kidneys.

1

SECTION - B

2

21. For the statements given below, write the balanced chemical equations.

- (a) Sodium carbonate on reaction with hydrochloric acid in equal molar concentrations gives sodium chloride and sodium hydrogen carbonate.

- (b) On treatment with potassium iodide, copper sulphate precipitates cuprous iodide (Cu_2I_2), liberates iodine gas and forms potassium sulphate.

22. If Aakash's cerebellum is damaged due to injury, what are the two things in his body that might not work well because of the damage?

2

23. (A) Give reasons for the following:

- (a) Decomposers are essential for nutrient cycling in ecosystems.

- (b) The length and complexity of food chains vary greatly.

- (c) Food chains are usually limited to three or four trophic levels.

- (d) The presence of pesticides in the food chain can lead to biological magnification.

2

OR

2

(B) Give any two ways in which biodegradable substances would affect the environment.

24. The refractive index of a medium with respect to air is 1.5. Calculate the speed of light in the medium if its speed in air is 3×10^8 m/s. 2
25. (A) Answer the following questions with proper reasoning. 2
- (a) What is the phenomenon of dispersion of light?
- (b) How is a rainbow formed?

OR

- (B) (a) What causes hypermetropia, and how can it be corrected? 2
- (b) How does atmospheric refraction cause the twinkling of stars?
26. Will the impact of removing all the organisms in a trophic level be different for different trophic levels? Can the organisms of any trophic level be removed without causing any damage to the ecosystem? 2

SECTION - C

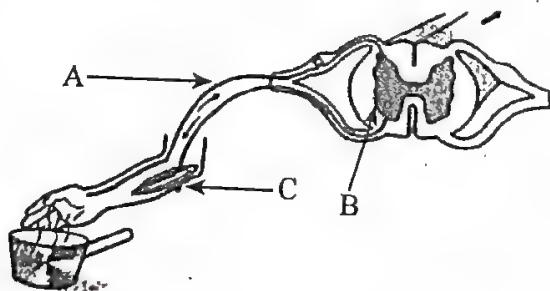
27. (a) Show the formation of Na_2O by showing transfer of electrons between atoms. 3
- (b) Why are ionic compounds usually hard?
- (c) In the solid state, ionic compounds do not conduct electricity while in molten state, they conduct. Explain.
28. (A) Salt A is commonly used in bakery products which on heating gets converted into another salt B, which is used to remove the hardness of water, along with this, evolution of gas C takes place. The gas C, when passed through lime water, turns it milky. Identify A, B and C. 3

OR

- (B) (i) Explain the reason of disappearance of milkiness on passing excess of carbon dioxide to lime water?
- (ii) To the three solutions given below, a few drops of phenolphthalein and blue litmus were added separately. Mention the change in colour in each case.

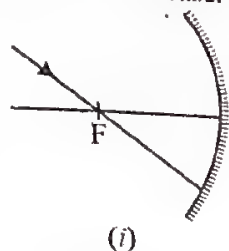
| Name of the solution | Colour change with phenolphthalein | Colour change with blue litmus |
|-----------------------|------------------------------------|--------------------------------|
| (a) Sodium carbonate | | |
| (b) Hydrochloric acid | | |
| (c) Sodium chloride | | |

29. (a) In the given diagram 3
- (i) Name the parts labelled A, B, and C.
- (ii) Write the functions of A and C.

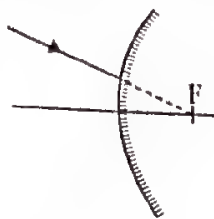


- (b) Reflex arcs have evolved in animals? Why? 3
30. In a pea plant, the trait of flowers bearing purple colour (PP) is dominant over white colour (pp). Explain the inheritance pattern of F_1 and F_2 generations with the help of a cross following the rules of inheritance of traits. State the visible characters of F_1 and F_2 progenies. 3
31. Imagine you're a physics teacher conducting an interactive classroom experiment. You want to illustrate Snell's Law of refraction to your students using a practical example by putting following questions.

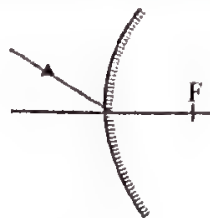
- (i) State Snell's Law of refraction and explain its significance in the study of optics.
- (ii) A light ray is incident on a glass slab at an angle 45° with the normal. If the refractive index of the glass is 1.5, calculate the angle of refraction.
- (iii) Draw a ray diagram to show the path of the light ray when it passes through the glass slab as described in (ii) part and comes out of the other side.
32. Draw the following diagram, in which a ray of light is incident on a concave and convex mirror, on your answer sheet. Show the path of this ray, after reflection, in each case.



(i)



(ii)



(iii)

33. Mohit is trying to repair a faulty electrical appliance. He notices that the insulation on the power cord is damaged, and the wires are exposed. Instead of using tape or makeshift solutions, he immediately disconnects the appliance from the mains to avoid any potential electrical hazards. He then replaces the damaged power cord with a new one before plugging the appliance back into the mains.

- (i) Why do you think Mohit's immediate action was crucial for safety?
- (ii) How can such responsible actions by individuals help prevent electrical accidents at home?

SECTION - D

34. (A) An organic compound 'P' is a constituent of wines. 'P' on reacting with acidified $K_2Cr_2O_7$ forms another compound 'Q'. When a piece of sodium is added to 'Q', a gas 'R' evolves which burns with a pop sound when a burning matchstick is brought near it.

- (a) Give the chemical name of compound P.
- (b) Mention another use of the compound 'P' apart from the use mentioned in the question.
- (c) Illustrate with the help of chemical equation the conversion of 'P' into 'Q'.
- (d) Give a balanced equation to depict the reaction of Q with sodium.
- (e) What happens when 'P' is heated with conc. H_2SO_4 at 443 K, write its chemical equation.

5

OR

- (B) An organic compound 'X' is a liquid at room temperature. It is also a very good solvent and has the molecular formula C_2H_6O . Upon oxidation 'X' gives 'Y'. 'Y' releases a gas 'W' with brisk effervescence on reacting with $NaHCO_3$. X reacts with Y in the presence of conc. H_2SO_4 to give another compound 'Z' which has a pleasant smell.

- (a) Give the chemical name and chemical formula of Y.
- (b) How will you test for the gas 'W'?
- (c) Depict the formation of Y and Z using chemical equations.
- (d) Name the reaction of the formation of 'Z'.
- (e) Give any one use of 'Z'?

5

35. (A) (a) List three events that occur during the process of photosynthesis.
- (b) Design an experiment to show that sunlight is essential for photosynthesis.

5

OR

- (B) (a) Priya was taking a stroll around a park and she noticed a fallen log covered in mushrooms. These mushrooms were thriving on the decaying wood, extracting nutrients from it. What kind of nutrition does this depict? How is it different from holozoic nutrition? Explain.

- (b) State the functions of liver and pancreas.
- (c) Name the organ which performs the following functions in humans:
- (i) Absorption of digested food (ii) Absorption of water.

5

36. (A) Imagine you are a passionate and curious physics teacher who loves to make learning exciting for your students. You want to illustrate the concept of magnetic field lines using a creative and interactive activity. With the help of a diagram, describe an activity to draw magnetic field lines around a bar magnet.

OR

- (B) State the factors on which the strength of an electromagnet depends. Differentiate between an electromagnet and a permanent magnet. List three uses of electromagnets.

SECTION - E

Q. Nos. 37 - 39 are source-based/case-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts:

37. Two students decided to investigate the effect of water and air on iron objects under identical experimental conditions. They measured the mass of each object before placing it partially immersed in 10 ml of water. After a few days, the objects were removed, and dried and their masses were measured. The table shows their results.

| Student | Object | Mass of Object before Rusting in g | Mass of the coated object in g |
|---------|------------|------------------------------------|--------------------------------|
| A | Nail | 3.0 | 3.15 |
| B | Thin plate | 6.0 | 6.33 |

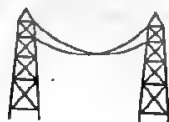
- (a) What might be the reason for the varied observations of the two students? 2
- (b) In another set up the students coated iron nails with zinc metal and noted that, iron nails coated with zinc prevents rusting. They also observed that zinc initially acts as a physical barrier, but an extra advantage of using zinc is that it continues to prevent rusting even if the layer of zinc is damaged. Name this process of rust prevention and give any two other methods to prevent rusting. 2

OR

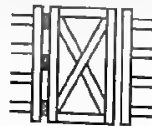
- (b) In which of the following applications of Iron, rusting will occur most? Support your answer with valid reason. 2



(A)



(B)



(C)



(D)

- (A) – Iron Bucket electroplated with Zinc
- (B) – Electricity cables having iron wires covered with aluminium
- (C) – Iron hinges on a gate
- (D) – Painted iron fence

38. Stamen is the male reproductive part and it produces pollen grains that are yellowish in color. Pistil is present in the centre of a flower and is the female reproductive part that produces ovule and each ovule has an egg cell. Plant X bears bisexual flowers i.e., contains both stamens and pistil. Plant Y bears unisexual flowers i.e., contains either stamens or pistils.

On the basis of above information give answers of the following questions.

- (a) Give an example of plants that could be placed at the position of X and Y. 1½
- (b) Which type of pollination and pollinating agents are required in case of X and Y? 1½
- (c) The removal of which part of flower prevents self pollination in plant X? 1

OR

- (c) What is the fate of fusion product of pollen grains and ovule? 1

39. **Electrical Consumption in a Household**

A household consists of various electrical appliances and devices. Let's consider the following appliances and their power ratings:

| | |
|-----------------|------------|
| Refrigerator | 150 watts |
| Air Conditioner | 1200 watts |
| Television | 100 watts |
| Electric Iron | 750 watts |
| LED Bulb | 10 watts |

- (a) Calculate the total power consumed by the household when all the appliances are running simultaneously. 1
- (b) If the electricity tariff is Rs. 5 per unit, calculate the cost of running these appliances simultaneously for 5 hours. 1
- (c) Due to high electricity bills, the family decides to reduce their consumption. They plan to use the air conditioner and electric iron for 3 hours only and switch off the other appliances when not in use. Recalculate the total power consumed and the cost for this scenario. 2

OR

- (c) Suggest two energy-saving tips that the family can implement to reduce their electricity consumption further. 2

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Q.P. Code 01

Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER

MATHEMATICS (STANDARD)

Time allowed : 3 hours

Maximum Marks : 80

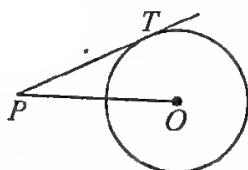
GENERAL INSTRUCTIONS:

- This question paper contains 38 questions. All questions are compulsory.
- Question paper is divided into FIVE sections – Section A, B, C, D and E.
- There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.
- Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION - A

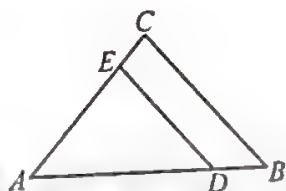
Section - A consists of Multiple Choice type questions of 1 mark each.

- If the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ is divided by a point P in the ratio $1 : k$ internally, then the coordinates of the point P are
 - $\left(\frac{x_2 - kx_1}{1+k}, \frac{y_2 - ky_1}{1+k} \right)$
 - $\left(\frac{x_2 + kx_1}{1+k}, \frac{y_2 + ky_1}{1+k} \right)$
 - $\left(\frac{x_2 + kx_1}{1-k}, \frac{y_2 + ky_1}{1-k} \right)$
 - $\left(\frac{x_1 + kx_2}{1+k}, \frac{y_1 + ky_2}{1+k} \right)$
- The distance of the point (4, 7) from the x-axis is
 - 7
 - 4
 - 11
 - $\sqrt{65}$
- The distance between the points (3, -2) and (-3, 2) is:
 - 40
 - $4\sqrt{10}$
 - $2\sqrt{10}$
 - $\sqrt{52}$
- $x^2 - 30x + 225 = 0$ have
 - Real roots
 - No real roots
 - Real and Equal roots
 - Real and Distinct roots
- How many bricks each measuring (25 cm \times 11.25 cm \times 6 cm) will be required to construct a wall (8 m \times 6 m \times 22.5 cm)?
 - 7200
 - 4800
 - 8000
 - 6400
- The arithmetic mean of 1, 2, 3, 4, ..., n is:
 - $\frac{n-1}{2}$
 - $\frac{n(n+1)}{2}$
 - $\frac{n}{2}$
 - $\frac{n+1}{2}$
- In the given figure point P is 26 cm away from the centre O of a circle and the length PT of the tangent drawn from P to the circle is 24 cm. Then, the radius of the circle is

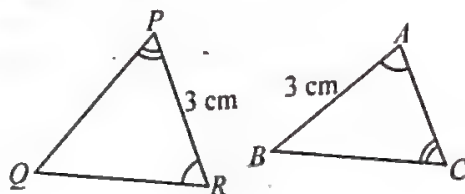


- 13 cm
- 10 cm
- 15 cm
- 12 cm

8. If polynomial $p(x) = x^3 - 15x^2 + 250$ has zeroes as $\alpha = \beta$, $\alpha + \beta$ and α , then find the value of α and β
 (a) 5, $\sqrt{75}$ (b) 5, 70 (c) 5, 25 (d) None of these
9. The minute hand of a clock is 10 cm long. The area of the face of the clock described by the minute hand between 10 A.M. and 10:35 A.M. is
 (a) 183.4 cm^2 (b) 84 cm^2 (c) 183 cm^2 (d) 184.5 cm^2
10. $\frac{1 + \tan^2 \theta}{\sec^2 \theta} =$
 (a) $\sec^2 \theta$ (b) 1 (c) $\frac{1}{\sin^2 \theta - \cos^2 \theta}$ (d) $\frac{1}{3}$
11. If the altitude of the sun is 60° , the height of a tower which casts a shadow of length 90 m is
 (a) 60 m (b) $90\sqrt{3} \text{ m}$ (c) 90 m (d) $60\sqrt{3} \text{ m}$
12. The system of equations $2x + 3y - 7 = 0$ and $6x + 5y - 11 = 0$ has
 (a) Unique solution (b) Infinite many solutions (c) No solution (d) Non zero solution
13. In the given figure PQ is a tangent to a circle with centre A . If $\angle QPA = 27^\circ$, the $\angle QAP$ is
 (a) 65° (b) 63° (c) 71° (d) 60°
14. In the figure given below $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, the value of x is:



- (a) 4 (b) 16 (c) 2 (d) 8
15. Two scalene triangles are given below.



Anas and Rishi observed them and said the following:

Anas: $\triangle PQR$ is similar to $\triangle CBA$

Rishi: $\triangle PQR$ is congruent to $\triangle CBA$

Which of them is/are correct?

- (a) Only Anas (b) Only Rishi (c) Both Anas and Rishi (d) Neither of them, as two scalene triangles can never be similar or congruent.

16. The curved surface area of a cone having height 24 cm & radius 7 cm, is
 (a) 1200 cm^2 (b) 550 cm^2 (c) 1300 cm^2 (d) 1252 cm^2
17. A buffalo is tied with a rope of length 14 m at the corner of a rectangular field of dimensions $20 \text{ m} \times 16 \text{ m}$, then the area of the field in which the buffalo can graze is
 (a) 154 m^2 (b) 156 m^2 (c) 168 m^2 (d) 160 m^2

18. The radii of two spheres are in the ratio 2 : 3. The ratio of their volume is

(a) 9 : 8

(b) 8 : 29

(c) 8 : 9

(d) 8 : 27

DIRECTIONS: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option out of the following:

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).
- (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.

19. Assertion (A): No two positive numbers can have 18 as their H.C.F and 380 as their L.C.M.

Reason (R): L.C.M. is always completely divisible by H.C.F.

20. Assertion (A): If a line intersects side AB and AC of a $\triangle ABC$ at D and E respectively and is parallel to BC , then $\frac{AD}{AB} = \frac{AE}{AC}$

Reason (R): If a line is parallel to one side of a triangle then it divides the other two sides in the same ratio.

SECTION - B

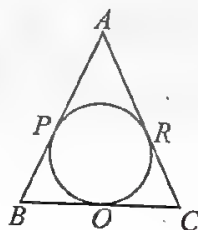
Section - B consists of Very Short Answer (VSA) type questions of 2 marks each.

21. (a) Find the value for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.

OR

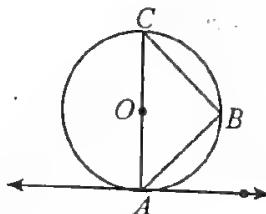
(b) Find the quadratic polynomial if the sum and Product of its zeroes are 2 and 1 respectively.

22. (a) In the adjoining figure, sides AB , BC and CA of a triangle ABC , touch a circle at P , Q and R respectively. If $PA = 4$ cm, $BP = 3$ cm and $AC = 11$ cm, then find the length of BC .



OR

(b) If AB is a chord of a circle with centre O . AOC is a diameter and AT is the tangent at A as shown in figure. Prove that $\angle BAT = \angle ACB$.



23. Is the given statement correct or not correct?

If two coins are tossed simultaneously there are three possible outcomes-two heads, two tails or one of each. Therefore, for each of these outcomes, the probability is $\frac{1}{3}$.

24. Three pieces of timber 48 m, 56 m, 72 m long now to be divided into the planks of the same length. What is the greatest possible length of each plank? Also find how many of planks are formed.

25. Find the non-zero value of k for which the roots of the quadratic $8x^2 - 2kx + k = 0$ are real & equal.

SECTION - C

consists of Short Answer (SA) type questions of 3 marks each.

Find the point on the x-axis which are at a distance of $2\sqrt{5}$ from point $(7, -4)$ How many such points are there?

OR

The line segment joining the points $A(3, -4)$ and $B(1, 2)$ is trisected at the points P and Q . Find the coordinates of P .

Diagonals AC and BD of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at point O . Using a similarity criterion for two triangles, show that $\frac{OA}{OC} = \frac{OB}{OD}$.

There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

OR

If the HCF of 657 and 963 is expressible in the form $657x + 963 \times (-15)$, find the value of x .

The shadow of a tower standing on a level ground is found to be 30 m longer when the sun's altitude is 30° , than when it was 60° . Find the height of the tower. [Take $\sqrt{3} = 1.732$.]

Write all the other trigonometric ratios of $\angle A$ in terms of $\sec A$.

Form the pair of linear equations for the problem & find their solution by substitution method. The coach of a cricket team buys 6 bats & 6 balls for ₹ 3500. Later, she buys 4 bats & 5 balls for ₹ 2400. Find the cost of each bat & each ball.

SECTION - D

Section D consists of Long Answer (LA) type questions of 5 Marks each.

(a) A train travels at a certain average speed for a distance 63 km and then travels a distance of 72 km at an average speed of 6 km/hr more than the original speed. If it takes 3 hours to complete total journey, what is its original average speed?

OR

(b) The difference of the squares of two numbers is 45. The square of the smaller number is 4 times the larger number. Determine the numbers.

(a) Find the difference of the areas of two segments of a circle formed by a chord of length 5 cm subtending angle of 90° at the centre.

OR

(b) A chord of a circle of radius 10 cm subtends a right angle at the center. Find the area of the corresponding: (Use $\pi = 3.14$)

(i) Minor sector

(ii) Major sector

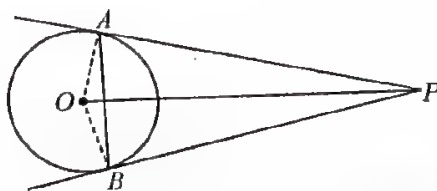
(iii) Minor segment

(iv) Major segment

4. The mean of the following distribution is 18. Find the frequency f of the class 19-21.

| Class | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
|-----------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 3 | 6 | 9 | 13 | f | 5 | 4 |

35. In figure, AB is a chord of length 15 cm, of a circle of radius 9 cm. The tangent at A & B intersect at a point P . Find the length of PA .



SECTION - E

Section - E consists of three Case Study Based questions of 4 marks each.

36. Saving money is a good habit and it should be inculcated in children from the beginning. Mrs. Pushpa brought a piggy bank for her child Akshar. He puts one five-rupee coin of his saving in the piggy bank on the first day. He increases his savings by one five-rupee coin daily.



- (i) If the piggy bank can hold 190 coins of five rupees in all, find the number of days he can contribute to put the five-rupee coins into it. 1
- (ii) Find the total money he saved. 2

OR

How many coins are there in piggy bank on 15th day?

- (iii) How much money Akshar saves in 10 days? 1

37. Two friends Richa and Sohan have some saving in their piggy bank. They decided to count the total coins they both had. After counting they find that they have fifty ₹ 1 coins, forty eight ₹ 2 coins, thirty six ₹ 5 coins, twenty eight ₹ 10 coins and eight ₹ 20 coins. Now, they said to Nisha, their another friends, to choose a coin randomly. Find the probability that the coin chosen is



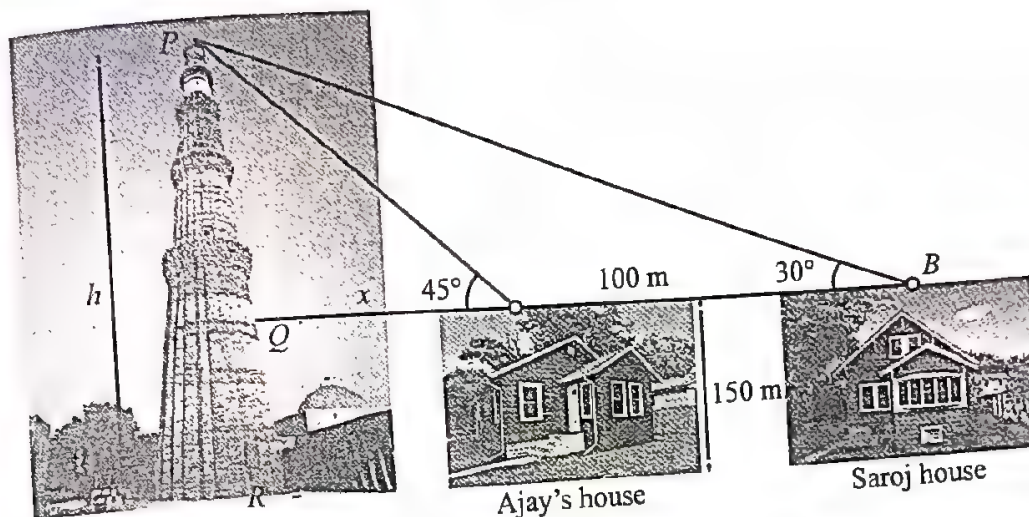
- (i) Find the probability that the coin chosen is ₹ 5 coin. 1
- (ii) Find the probability that the coin chosen is denomination of atleast ₹ 10 coin. 2

OR

Find the probability that the coin chosen is denomination of atmost ₹ 5 coin

- (iii) Find the probability that the coin chosen is not ₹ 10 coin. 1

The houses of Ajay and Sooraj are at 100 m distance and the height of their houses is the same as approx 150 m. One big tower was situated near their house. Once both friends decided to measure the height of the tower. They measure the angle of elevation of the top of the tower from the roof of their houses. The angle of elevation of Ajay's house to the tower and Sooraj's house to the tower are 45° and 30° respectively as shown in the figure.



- (i) Find the height of the tower.
- (ii) Find the distance between top of the tower and top of Sooraj's house?

OR

- Find the distance between top of tower and top of Ajay's house?
- (iii) What is the distance between the tower and the house of Sooraj?

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Q.P. Code 01

Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER (SOCIAL SCIENCE)

Time allowed : 3 hours

Maximum Marks : 80

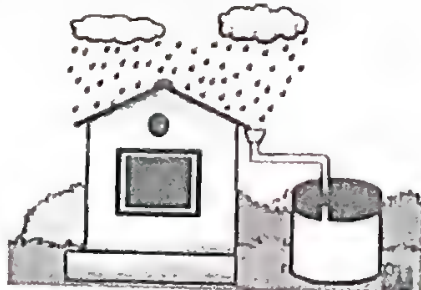
GENERAL INSTRUCTIONS:

- (i) This question paper consists of 37 questions. All questions are compulsory.
- (ii) Question paper is divided into SIX sections viz. Section A, B, C, D, E and F.
- (iii) There is no overall choice. However, an internal choice has been provided in some questions.

SECTION-A

(MULTIPLE CHOICE QUESTIONS)

1. In a hypothetical scenario, a large-scale mining project is planned in a region known for its rich biodiversity and tribal population. The project aims to extract valuable minerals, which would contribute significantly to the country's economy. However, it is likely to have adverse effects on the environment and the indigenous communities residing in the area. What should be the primary consideration when evaluating the feasibility of this mining project? (20 × 1 = 20)
(a) Economic benefits and revenue generation for the country
(b) Preservation of biodiversity and protection of indigenous rights
(c) Technological advancements and resource extraction efficiency
(d) Mitigating environmental impact through regulatory measures 1
2. There are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option. 1
Assertion (A): Deforestation leads to a loss of biodiversity and disrupts the ecological balance.
Reason (R): Forests are home to a wide variety of plant and animal species, and their destruction results in habitat loss and species extinction.
Options:
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.
3. Which technique is shown in the image for conserving water? 1



- (a) Watershed (b) Rainwater harvesting (c) Rooftop saving (d) Saving water in umbrella

4. Rajesh is a farmer who grows vegetables. He needs to buy seeds and fertilizers for his farm but doesn't have any money at the moment. He decides to trade his vegetables directly with the shopkeeper who sells seeds and fertilizers. What problem does Rajesh face in this barter system, which would be solved by using money as a medium of exchange?
- Finding a shopkeeper who needs vegetables and is willing to exchange them for seeds and fertilizers.
 - Ensuring the quality of the seeds and fertilizers he receives in exchange for his vegetables.
 - Getting a discount on the seeds and fertilizers he needs.
 - Transporting the vegetables to the shopkeeper's location.
5. What is the role of the highest court in a federal system?
- Interpret the constitution only.
 - Resolve disputes between different government levels.
 - Legislate new laws.
- Only (i)
 - Only (ii)
 - (i) and (ii) only
 - (i), (ii) and (iii)
6. "When France sneezes, the rest of Europe catches cold". Who among the following said this popular line?
- Giuseppe Mazzini
 - Metternich
 - Otto Von Bismarck
 - Guiseppe Garibaldi
7. Which of the following statement is true regarding Belgium?
- Statement I:** Belgium is a small country in United States, smaller in area than the state of Haryana.
- Statement II:** It has borders with France, the Netherlands, Germany and Luxembourg.
- Statement III:** In Belgium, some special laws require the support of a majority of members from each linguistic group.
- Statement IV:** Single community can make decisions unilaterally.
- Options:**
- Statement (II) and (III) are correct
 - Statement (I), (II), (III) and (IV) are correct
 - Only Statement (IV) is correct
 - Statement (I) and (IV) are correct
8. In which one of the following Indian National Congress sessions was the demand for 'Purna Swaraj' formalised?
- Madras Session
 - Lahore Session
 - Calcutta Session
 - Nagpur Session
9. Which of the following statements are correct regarding 'Holding together federation'?
- A large country divides its power between constituent states and the national government.
 - The Central government tends to be more powerful vis-a-vis the States.
 - Constituent states have equal powers.
 - Constituent states have unequal powers.
- Options:**
- Only A
 - A and D
 - B and D
 - A, B, and D
10. Two statements are given below as Assertion (A) and Reason (R). Read the statements and choose the correct option.
- Statement-I:** A multi-party system is better for democracy than a two-party system.
- Statement-II:** A multi-party system allows for a greater diversity of voices and perspectives to be represented in government.
- Options:**
- Both Statement-I and Statement-II are correct.
 - Both Statement-I and Statement-II are incorrect.
 - Statement-I is correct & Statement-II is incorrect.
 - Statement-I is incorrect & Statement-II is correct.
11. Which of the following regarding the affidavit is correct?
- A signed document submitted to an officer.
 - Contain details of his property and criminal cases pending against him
 - There is a system of checking if the information given by the candidate is correct
 - It is not mandatory for every candidate who contests election to file an affidavit.
- Options:**
- Only (i)
 - Only (ii) and (iii)
 - Only (iii)
 - Only (i) and (ii)

12. Match Column-I with Column-II and choose the correct option:

| Column-I | | Column-II | |
|----------|---|-----------|---|
| A. | A democratic government is a | (i) | improves the quality of decision making |
| B. | A democracy is attentive to the needs of | (ii) | legitimate government |
| C. | Democracy is considered a better form of government as it | (iii) | all citizens |

Option:

- (a) A-(ii), B-(iii), C-(i) (b) A-(ii), B-(i), C-(iii) (c) A-(iii), B-(ii), C-(i) (d) A-(iii), B-(i), C-(ii)

13. Arrange the following events in chronological order and choose the correct option.

- (i) Revolt against economic hardships.
(ii) Napoleon invades Italy.
(iii) Slav nationalism gathers force in the Habsburg and Ottoman Empires.
(iv) Greek struggle for independence begins.

Option:

- (a) (i), (ii), (iv), (iii) (b) (ii), (iv), (i), (iii) (c) (ii), (i), (iv), (iii) (d) (iii), (iv), (ii), (i)

14. _____ aims at maintaining the quality of life of both the present and future generations.

- (a) Development (b) Economic Growth
(c) Gross Development Product (d) Sustainable Development

15. Study the data given below:

| Country | Total GDP | GDP Per Capita |
|---------------|----------------------|----------------|
| United States | \$25,462,700,000,000 | \$75,269 |
| China | \$17,963,200,000,000 | \$12,598 |

Source: <https://www.worldometers.info/gdp/gdp-by-country/>

Despite having a higher total Income than the United States, China has a lower per capita Income. What is the reason for this?

- (a) United States has a more equitable distribution of income
(b) China has more rich people than the poor people
(c) China has a smaller population than United States
(d) China has a bigger population than United States

16. GDP is the total value of _____ produced during a particular year.

- (a) all goods and services (b) all final goods and services
(c) all intermediate goods and services (d) all intermediate and final goods and Services

17. Evaluate the impacts of opening foreign trade on the global economy by identifying the appropriate statements among the following options:

Statement-I: The choice of goods in the markets increase.

Statement-II: Producers from two countries closely compete against each other despite the distance between their locations.

Statement-III: Foreign trade thus results in connecting the markets or integration of markets in different countries.

Statement-IV: The quality of the product gets better good.

Options:

- (a) Statements-I and II are appropriate. (b) Statements-I, II and III are appropriate.
(c) All the statements are appropriate. (d) Only statement-IV is appropriate.

18. Globalisation has led to improvement in standard of living of-

- (a) All the people (b) Persons in developed countries
(c) Workers in developing countries (d) None of the above

19. Choose the correct option to fill in the blank

Removing barriers or restrictions on business and trade set by the government is called as _____

- (a) Disinvestment (b) Special economic zones (c) Liberalisation (d) Foreign direct investment

20. Identify the picture and choose the correct options:



(a) Marianne

(b) Bharat mata

(c) Germania

(d) Stellas 'italia'

SECTION - B

(4 × 2 = 8)

VERY SHORT ANSWER QUESTIONS

21. What are the three lists mentioned in the Indian constitution? 2
22. (a) The strongest weapon used by the Spanish conqueror was not at all an ordinary military weapon. Justify the mentioned claim using two reasons. 2

OR

- (b) "Traders and travellers introduced new crops to the land they travelled". Give examples to support this statement. 2
23. What is BMI? Your friend is 1.50 m tall and weighs 40 kg. Find out his BMI and comment on his report. 2
24. Mrs. Sharma, who is from southern state Tamil Nadu, wants to grow wheat or tea. Out of the two crops, which one can he grow in his state? Give any two reasons to support your response. 2

SECTION - C

(5 × 3 = 15)

SHORT ANSWER QUESTIONS

25. Why couldn't the production of handwritten manuscripts satisfy the ever increasing demand for books? Give any three reasons. 3
26. (a) A worker in an urban region who was employed by a small manufacturer was recently fired and was later discovered selling electrical goods from a pushcart after being illegally paid, made to work overtime, and subjected to poor conditions at work. Examine how the government may best protect those employed in unorganised industries. 3

OR

- (b) According to the MGNREGA Act, Mr. Kishan, the head of the village, wished to increase employment possibilities to raise the income of his villagers. Please suggest any three activities that Mr. Kishan might start in his community 3
27. Describe the locations where rice is grown in India. 3
28. "The concept of democracy is overwhelmingly supported throughout the world". Explain this claim. 3
29. How has globalisation impacted the employment conditions of workers in India? 3

SECTION - D

(4 × 5 = 20)

LONG ANSWER QUESTIONS

30. (a) Give examples to distinguish between metallic and non-metallic minerals. 5
- OR
- (b) Name the non-metallic mineral which can split easily into thin sheets. Mention its uses. 5
31. (a) Identify the five methods the French Revolutionaries used to promote a sense of national unity among the French people. 5

OR

(b) How had revolutionaries spread their ideas in many European States after 1815? Explain with examples.

32. (a) "The existence of political parties is essential to a democracy". Examine the assertion.

OR

(b) Describe any five measures to reform political parties in India.

33. (a) A poor farmer borrowed money at a high rate of interest from a moneylender, and when he was unable to pay it back, he had to borrow money from another landlord to pay back the moneylender's interest. Mention what impact this might have on him..

OR

(b) "Self-help groups empower women and eradicate poverty." Support this statement with examples.

SECTION - E

CASE BASED/SOURCE BASED QUESTIONS

34. Read the text carefully and answer the questions

(3 × 4 = 12)

Communalism was and continues to be one of the major challenges to democracy in our country. The makers of our Constitution were aware of this challenge. That is why they chose the model of a secular state. This choice was reflected in several constitutional provisions. There is no official religion in the Indian state. Unlike the status of Buddhism in Sri Lanka, that of Islam in Pakistan, and that of Christianity in England, our Constitution does not give a special status to any religion. The Constitution provides to all individuals and communities the freedom to profess, practice, and propagate any religion, or not to follow any religion.

(i) What is a secular state?

(ii) What measures have our constitutional framers taken to ensure secularism in our country?

(iii) How has India taken a different path than other nations like Sri Lanka, Pakistan, and England in the context of religion?

35. Read the text carefully and answer the questions:

For centuries, silk and spices from China flowed into Europe through the silk route. In the eleventh century, Chinese paper reached Europe via the same route. Paper made possible the production of manuscripts, carefully written by scribes. Then, in 1295, Marco Polo, a great explorer, returned to Italy after many years of exploration in China.

China already had the technology of woodblock printing. Marco Polo brought this knowledge back with him. Now Italians began producing books with woodblocks, and soon the technology spread to other parts of Europe. Luxury editions were still handwritten on very expensive vellum, meant for aristocratic circles and rich monastic libraries which scoffed at printed books as cheap vulgarities. Merchants and students in the university towns bought the cheaper printed copies.

The production of handwritten manuscripts could not satisfy the ever-increasing demand for books. Copying was an expensive, laborious and time-consuming business. Manuscripts were fragile, awkward to handle, and could not be carried around or read easily. Their circulation, therefore, remained limited. With the growing demand for books, woodblock printing gradually became more and more popular.

(i) Despite the introduction of print-culture, why were luxurious editions still handwritten?

(ii) Describe a drawback of handwritten manuscripts in comparison to printed material.

(iii) What was Marco Polo's contribution to print culture?

36. Read the text carefully and answer the questions:

Water is a vital resource for all living beings. It is essential for various activities such as drinking, cooking, bathing, agriculture, and industry. However, the availability of clean and safe water is a major concern in many parts of the world. In India, the water crisis is a pressing issue, with many regions facing water scarcity and contamination. The main sources of water in India are rivers, lakes, ponds, and groundwater. Rivers are the primary source of freshwater, with the Ganga, Brahmaputra, and Yamuna being the major rivers. These rivers not only provide water for domestic use but also support agriculture and industry. Lakes and ponds are also important sources of water, especially in rural areas. Groundwater, obtained through wells and tube wells, is another significant source of water in India. However, the increasing population and rapid urbanization have put immense pressure on water resources. The demand for water has surpassed the available supply, leading to overexploitation and depletion of water sources. Moreover, pollution from industrial waste, sewage, and agricultural run-off has further

worsened the quality of water, making it unfit for consumption. To address these challenges, it is crucial to adopt sustainable water management practices. This includes rainwater harvesting, water conservation, and efficient use of water resources. Government initiatives like the National Water Mission and Swachh Bharat Abhiyan aim to improve water availability and quality across the country. Additionally, public awareness and participation are essential for the success of these initiatives.

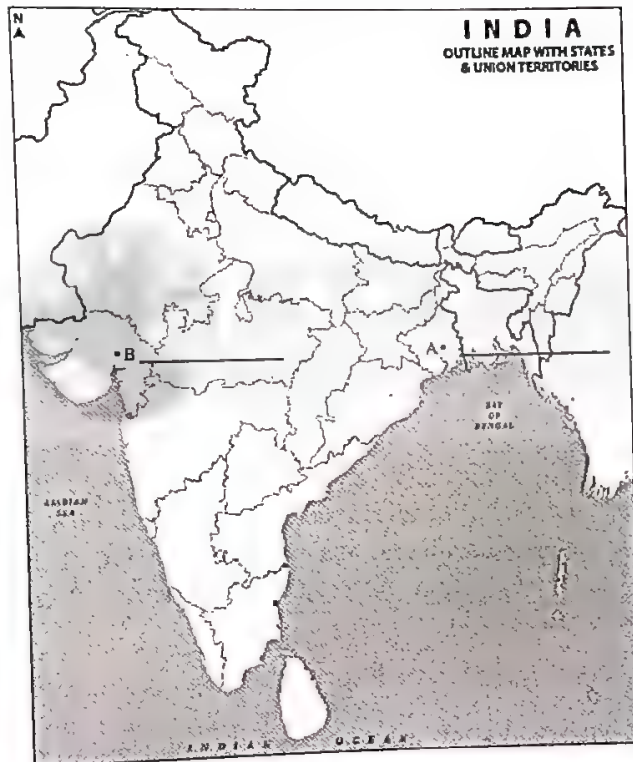
- (i) What are the main sources of water in India? 1
- (ii) Why is the availability of clean and safe water a major concern in many parts of the world? 1
- (iii) How can individuals contribute to sustainable water management? 2

SECTION - F

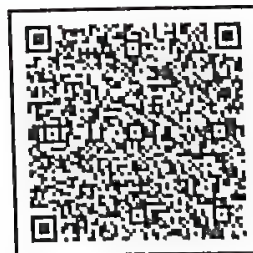
AP SKILL BASED QUESTIONS

(2 + 3 = 5)

37. (a) Two places A and B have been marked on the given outline map of India. Identify them and write their correct names on the lines drawn near them. 2
 - A. The place where the Indian National Congress session was held in September, 1920.
 - B. The place associated with the Peasant Satyagraha.
- (b) On the same outline map of India, locate and label any **three** of the following with suitable symbols. 3
 - (i) Marmagao - Major Sea Port
 - (ii) Hyderabad - Software Technology Park
 - (iii) Durg - Iron ore mines
 - (iv) Kalpakkam - Nuclear Power Plant



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Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER

(ENGLISH-LANGUAGE & LITERATURE)

Time allowed : 3 hours

Maximum Marks : 80

GENERAL INSTRUCTIONS:

- (i) This question paper comprises 11 questions. All questions are compulsory.
- (ii) The question paper contains **THREE** sections- Reading Skills, Writing Skills and Grammar, Literature.
- (iii) Attempt questions based on specific instructions for each part.

SECTION - A

READING SKILLS

(20 marks)

1. Read the following text.

(10 m)

1. There's something undeniably thrilling about diving deep into the world of crime-solving. The adrenaline rush that comes from piecing together clues, unraveling mysteries, and ultimately catching the culprit is unmatched. It's like being the protagonist in your very own detective novel, except the stakes are real and the consequences are far-reaching. But solving a crime is not as glamorous as it may seem in books or movies. It's a complex and often grueling process that requires meticulous attention to detail, sharp analytical skills, and a dash of intuition.
2. The journey begins with the crime scene itself, a puzzle waiting to be solved. Every piece of evidence, no matter how small or seemingly insignificant, holds the potential to crack the case wide open. Fingerprints, footprints, DNA samples - they all play a crucial role in building a solid case against the perpetrator. It's like assembling a jigsaw puzzle, where each piece brings us closer to the bigger picture. And just like in a puzzle, sometimes a single missing piece can make all the difference between closure and a cold case.
3. But solving a crime isn't just about the physical evidence. It's also about understanding the human element, the motives and emotions that drive people to commit unthinkable acts. It's like peering into the depths of the human psyche, trying to make sense of the incomprehensible. The more we delve into the minds of both the victim and the suspect, the clearer the path to the truth becomes. It's a delicate dance between empathy and detachment, as we strive to understand the why behind the what.
4. As the investigation progresses, the web of suspects grows wider, and the plot thickens. It's like navigating a labyrinth, where every turn leads to new twists and turns. The detective must be prepared to chase false leads, question unreliable witnesses, and sift through red herrings. It's a game of wits, where the detective must stay one step ahead of the criminal. And just when it seems like all hope is lost, a breakthrough emerges, shedding light on the darkest corners of the case.
5. Ultimately, solving a crime is not just about catching the culprit, but also about bringing justice to the victims and their loved ones. It's like being a beacon of hope in a world plagued by darkness. The satisfaction that comes from knowing that justice has been served is immeasurable. It's a reminder that even in the face of evil, good will prevail. And for those who dedicate their lives to solving crimes, it's a calling that requires resilience, dedication, and an unwavering commitment to the truth.

Answer the following questions, based on the passage above.

- (i) Which of the following statements best describes the author's attitude towards studying crime-solving? 1
- (a) Finds crime-solving to be a frustrating and meaningless endeavor.
 - (b) Believes that the challenges of crime-solving outweigh the rewards.
 - (c) Recognizes the thrill and satisfaction that comes from diving deep into the world of crime-solving.
 - (d) Feels that crime-solving is too complex and grueling for the average person to handle.
- (ii) What is the tone of the writer in the given lines from paragraph (4)? Rationalize your response in about 40 words: 2
- As the investigation progresses, the web of suspects grows wider, and the plot thickens. It's like navigating a labyrinth, where every turn leads to new twists and turns.*
- (iii) Complete the sentence appropriately: 1
- The author's emphasis on the importance of attention to detail and analytical skills in crime-solving highlights _____
- (iv) From the sets (a)-(e) below, identify a set of synonyms based on the paragraph: 1

- | | |
|-----------------------------------|--------------------------|
| (a) Clearer - Incomprehensible | (b) Empathy - Detachment |
| (c) Unraveling - Piecing together | (d) Closure - Cold case |
| (e) Hope - Darkness | |

- (v) Complete the sentence appropriately: 1
- Solving a crime is not as glamorous as it may seem in books or movies. It's a complex and often grueling process that requires meticulous attention to detail, sharp analytical skills, and a dash of intuition. It's like _____
- (vi) Based on the reading of the paragraph, compare the author's viewpoint on crime-solving to exploring a new city. Explain in about 40 words. 2
- (vii) What message is conveyed by the experience of catching the culprit, as mentioned in the paragraph? 1
- (a) Crime-solving is a dangerous and risky pursuit.
 - (b) The satisfaction of catching the culprit outweighs the challenges faced.
 - (c) Catching the culprit guarantees fame and recognition.
 - (d) The efforts of crime-solving are not worth the outcome.
- (viii) State whether the following lines from the paragraph display an example of an enthusiastic/skeptical/nostalgic/philosophical tone: 1
- The satisfaction that comes from knowing that justice has been served is immeasurable. It's a reminder that even in the face of evil, good will prevail. And for those who dedicate their lives to solving crimes, it's a calling that requires resilience, dedication, and an unwavering commitment to the truth.*

(10 m)

2. Read the following text.

1. Scientific exploration plays a pivotal role in expanding our understanding of the natural world and pushing the boundaries of human knowledge. Through rigorous experimentation, observation, and analysis, scientists delve into uncharted territories, uncovering new phenomena and unveiling the secrets of the universe.
2. One area of scientific exploration that has garnered significant attention is the study of dark matter. Dark matter, although invisible and elusive, is believed to make up a substantial portion of the universe's mass. Scientists have embarked on ambitious projects, such as the Large Hadron Collider, to detect and understand this mysterious substance.
3. In recent years, gravitational wave astronomy has emerged as a groundbreaking field of scientific exploration. By detecting and analyzing the ripples in spacetime caused by cataclysmic cosmic events, such as the collision of black holes or the merging of neutron stars, scientists have been able to gain unprecedented insights into the nature of the universe.
4. Table 1 presents key statistical data related to the detection of gravitational waves. These data points highlight the significance of recent discoveries and the collaborative efforts of international research teams in advancing our understanding of the cosmos.

(Table 1 - Gravitational Wave Detection Statistics)

| Year | Number of Detected Events | Collaborating Research Teams |
|------|---------------------------|--|
| 2015 | 2 | LIGO Scientific Collaboration |
| 2016 | 4 | LIGO Scientific Collaboration |
| 2017 | 5 | LIGO Scientific Collaboration, Virgo Collaboration |
| 2018 | 13 | LIGO Scientific Collaboration, Virgo Collaboration |
| 2019 | 23 | LIGO Scientific Collaboration, Virgo Collaboration |

Disclaimer: The data given above is provided for reference purposes only and may not necessarily represent factual information.

5. Scientific exploration not only expands our knowledge but also has practical applications. For instance, advancements in genetic engineering have paved the way for groundbreaking medical treatments and the potential to eradicate genetic diseases. Additionally, space exploration has led to technological innovations that have improved our daily lives, from satellite communication to weather forecasting.
6. While scientific exploration has brought numerous benefits, it also poses ethical considerations. As scientists delve into uncharted territories, it is crucial to ensure responsible research practices and consider the potential implications of their discoveries on society and the environment.
7. In conclusion, scientific exploration is a driving force behind human progress and understanding. Through the exploration of dark matter, gravitational waves, and other frontiers, scientists continue to unravel the mysteries of the universe and pave the way for future advancements. It is through their dedication and commitment to the pursuit of knowledge that we can navigate the complexities of our world and shape a better future for all.

Answer the following questions, based on the passage above.

- (i) Complete the following analogy appropriately: 1
Just as scientific exploration plays a pivotal role in expanding our understanding of the natural world, it is comparable to a key that unlocks the secrets of the universe because _____.
- (ii) Fill the blanks with the appropriate option from those given in brackets, based on your understanding of paragraph (5). 1
The statement that 'Advancements in genetic engineering have paved the way for groundbreaking medical treatments and the potential to eradicate genetic diseases' is a/an _____ (fact/opinion).
- (iii) Justify the following statement in about 40 words: 2
While scientific exploration has brought numerous benefits, it also poses ethical considerations. As scientists delve into uncharted territories, it is crucial to ensure responsible research practices and consider the potential implications of their discoveries on society and the environment.
- (iv) According to Table 1, which year had the highest number of detected gravitational wave events? 1
- (v) From the information provided in the passage, what can be inferred about the collaborative efforts in detecting gravitational waves? 1
- (vi) In the context of the passage, what does the word 'cataclysmic' most closely mean? 1
(a) miraculous (b) disastrous or violent (c) joyful (d) indifferent
- (vii) Compare and contrast the study of dark matter and gravitational wave astronomy based on the information in the passage. What are the similarities and differences in their approaches and significance? (Answer in about 40 words) 2
- (viii) Which of the following best captures the main idea of the passage? 1
(a) Scientific exploration leads to technological innovations.
(b) Dark matter is a significant area of scientific exploration.
(c) Gravitational wave astronomy has revolutionized our understanding of the universe.
(d) Scientific exploration expands our knowledge and has practical applications.

SECTION - B

WRITING SKILLS & GRAMMAR

GRAMMAR

(20 marks)

10

(10 × 1 = 10)

Attempt ANY TEN of twelve of the following questions.

- (i) Fill in the blank by using the correct form of the word in the bracket, for the given portion of a letter to Editor.
Through the columns of your esteemed newspaper, I _____ (like/would like/have liked) to draw the attention of the concerned authorities on the issue of water supply in our locality.
- (ii) Read the given sentence from a news article. Identify the error and supply the correction in the sentence.
The company's new product is expecting to launch next month.

Use the given format for your response.

| Error | Correction |
|-------|------------|
| | |

- (iii) Rahul and Priya had a conversation about their upcoming business presentation. Report Rahul's question.
Did you prepare the slides of our upcoming business presentation?
- (iv) Read the dialogue between Ravi and his colleague, Maya, discussing their upcoming project deadline.
Maya: Are you ready for the meeting tomorrow?
Ravi: Yes, I have prepared all the slides and notes.
Select the correct option to complete the reporting of the above dialogue.
Maya asked Ravi if he was ready for the meeting the following day. Ravi replied affirmatively, stating _____
all the slides and notes.
(a) if he was ready (b) that he had prepared (c) whether he is ready (d) that he is preparing
- (v) Fill the blank by choosing the correct option, to complete the concluding line of an email from a project manager to an employee.
Your efforts have not only made a positive impact on the project but _____ (had/has/have) also set a high standard for the entire team.
- (vi) Identify the error and supply correction for the given sentence from a company's social media post.
We are please to announce the launch of our new website.

Use the given format for your response.

| Error | Correction |
|-------|------------|
| | |

- (vii) Select the option that identifies the error and supplies the correction for the following sentence from a research paper.
The study reveals a strong correlation among sleep deprivation and mental health issues.

| Option | Error | Correction |
|--------|---------------|--------------------|
| (a) | reveals | reveal |
| (b) | among | between |
| (c) | deprivation | deprivations |
| (d) | mental health | mental healthiness |

- (viii) Complete the given narrative, by filling the blank with the correct option.
The unexpected turn of events left the protagonist feeling _____ about the future.
(a) uncertain (b) confident (c) optimistic (d) anxious
- (ix) Report the dialogue between a customer and a salesperson, by completing the sentence.
Customer: Can you recommend a good restaurant in this area?
Salesperson: Certainly! There's a popular Italian restaurant just around the corner.
The customer asked the salesperson _____ in that area. The salesperson replied affirmatively and mentioned a popular Italian restaurant just around the corner.

- (x) Fill the blank by choosing the correct option to complete the announcement made by a school principal during a morning assembly.
We are pleased to announce that our school has decided _____ a new sports scholarship program for talented athletes.
(a) to launch (b) launched (c) will launch (d) None of the above
- (xi) Complete the line from a motivational song, by filling the blank with the correct option.
I will rise, I will _____ (shine/shining/shone) brighter than the stars.
- (xii) Identify the error and supply correction for the following note in a user manual.

Note- Please ensure that turn off the device before inserting or removing the battery.

Use the given format for your response.

| Error | Correction |
|-------|------------|
| | |

WRITING

(Note: All details presented in the questions are imaginary and created for assessment purpose.)

4. Attempt ANY ONE from A and B given below:

- (A) Write a letter to the editor of a publication, in about 120 words, about the issue of air pollution in your city in India. In the letter, express your concerns about the health hazards caused by air pollution, suggest practical solutions to reduce air pollution, and highlight the benefits of adopting cleaner energy sources.

OR

- (B) Write a letter to the local municipal corporation, in about 120 words, about the issue of inadequate waste management in your neighborhood in India. In the letter, express your concerns about the environmental and health consequences of improper waste disposal, suggest practical solutions to improve waste management, and highlight the benefits of adopting sustainable waste management practices.

5. Attempt ANY ONE from A and B given below:

- (A) Imagine you are a travel enthusiast and have been asked to study the itinerary provided by a tour-organizing vendor for a trip to India. Your task is to analyze the itinerary and assess its feasibility, safety, and overall interest for potential travellers.

The trip duration is 10 days and includes visits to popular destinations in India such as Delhi, Agra, Jaipur, and Varanasi. The itinerary includes activities like guided tours of historical monuments, cultural performances, and interactions with local communities. Accommodation will be provided in well-rated hotels, and transportation will be via air-conditioned vehicles.

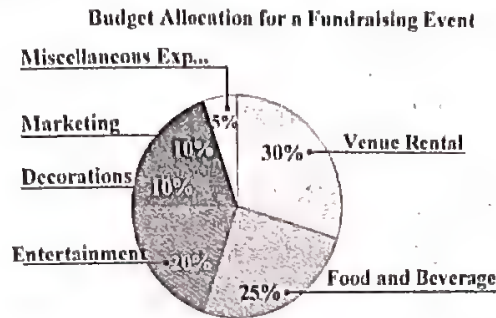
Data Table: Here is a sample table representing the itinerary:

| Date | Time of Departure | Activity | Duration |
|--------|-------------------|------------------------------------|----------|
| Day 1 | 9:00 AM | Arrival in Delhi | - |
| Day 2 | 10:00 AM | Guided tour of Old Delhi | 6 hours |
| Day 3 | 8:00 AM | Travel to Agra | 4 hours |
| Day 4 | 9:00 AM | Visit Taj Mahal | 3 hours |
| Day 5 | 8:00 AM | Travel to Jaipur | 5 hours |
| Day 6 | 10:00 AM | Explore Jaipur's palaces and forts | 8 hours |
| Day 7 | 9:00 AM | Travel to Varanasi | 6 hours |
| Day 8 | 6:00 AM | Boat ride on Ganges River | 2 hours |
| Day 9 | 9:00 AM | Visit Varanasi temples | 5 hours |
| Day 10 | 12:00 PM | Departure from Varanasi | - |

Write a paragraph of about 120 words analyzing the provided itinerary in terms of its feasibility, safety, and overall interest for potential travellers. Consider factors such as travel time, duration of activities, and the variety of experiences offered.

OR

- (B) You are a member of a school committee responsible for organizing a fundraising event. The committee has received a proposal from a vendor that includes a budget breakdown for the event. You have been asked to study the provided pie chart representing the budget allocation and analyze it based on specific criteria.



SECTION - C

LITERATURE TEXTBOOK AND SUPPLEMENTARY READING TEXT

(40 marks)

5

Read the given extracts and answer the questions for ANY ONE of the two, given.

- (A) With a satisfied expression, he regarded the field of ripe corn with its flowers draped in a curtain of rain. But suddenly a strong wind began to blow and along with the rain very large hailstones began to fall. These truly did resemble new silver coins. The boys, exposing themselves to the rain, ran out to collect the frozen pearls. "It's really getting bad now," exclaimed the man. "I hope it passes quickly. It did not pass quickly. For an hour, the hail rained on the house, the garden, the hillside, the cornfield, and the whole valley. The field was white as if covered with salt.

(A Letter to God)

- (i) From the paragraph, what can be inferred about the weather conditions during the hailstorm? 1

- (ii) State TRUE or FALSE: 1

None of the options (a)-(c) below can be applied regarding the term 'hailstones' in the paragraph:

- (a) small pieces of ice that fall as precipitation
- (b) round in shape like silver coins
- (c) soft and gentle in texture

- (iii) With reference to the extract, explain the impact of the hailstorm on the field and surroundings in about 40 words. 2

- (iv) Which word in the paragraph can substitute the term 'frozen pearls' without changing the meaning? 1

OR

- (B) It was a quiet, kindly voice, but one with firmness in it. A woman was standing in the doorway, and Sherry was rubbing against her. She was young, quite pretty, and was dressed in red. She walked to the fireplace and straightened the ornaments there. "Down, Sherry," she said. "Anyone would think I'd been away for a month!" She smiled at Horace, and went on, "However, I came back just in time, though I didn't expect to meet a burglar.

(A Question of Trust)

- (i) Which of the following is NOT mentioned about the woman in the paragraph? 1

- (a) She has a firm voice.
- (b) She is dressed in blue.
- (c) She is quite pretty.
- (d) She has a pet named Sherry.

- (ii) Why does the woman's statement, "Anyone would think I'd been away for a month!" seem ironic? Answer in about 40 words. 2

- (iii) Which of the following best describes the extract: 1

- (a) A narrative description of a character and setting.
- (b) A monologue where the character expresses her surprise.
- (c) A dialogue between two characters discussing their plans.

- (iv) If this extract were to be performed on stage, how should the actress playing the woman emphasize the word "burglar" to convey her surprise? 1

7. Read the given extracts and answer the questions for ANY ONE of the two, given.

(A) He hears the last voice at night,

The patrolling cars,
And stares with his brilliant eyes
At the brilliant stars.

(A Tiger in the Zoo)

(i) Fill in the Blank:

The tiger stares with his brilliant eyes at the _____.

(ii) What does the poet imply by 'He hears the last voice at night'?

(iii) What emotion is most evident in the tiger in these lines?

(a) Joy

(b) Indifference

(c) Curiosity

(d) Sadness

(iv) Comment on the poet's use of the adjective 'brilliant' in describing both the tiger's eyes and the stars.

OR

(B) All night the roots work

to disengage themselves from the cracks
in the veranda floor.

The leaves strain toward the glass

small twigs stiff with exertion

long-cramped boughs shuffling under the roof

like newly discharged patients

half-dazed, moving

to the clinic doors.

(The Trees)

(i) How does the language in the poem deviate from conventional poetic expressions?

(ii) What is the significance of the word "exertion" in the poem, and how does it shape the poem's overall mood and tone? Answer in about 40 words.

(iii) Based on the content of the poem, what is the overall mood or atmosphere portrayed?

(a) Joyful

(b) Melancholic

(c) Serene

(d) Energetic

(iv) Which literary device is predominantly used in the poem to convey its central theme?

8. Answer ANY FOUR of the following five questions, in about 40-50 words.

(4 × 3 = 12)

(i) Justify the opinion that the underlying theme of resilience in "Madam Rides the Bus" by Valli is a central element of the story's narrative and character development.

(ii) How does Ogden Nash utilize rhyme and humor in "The Tale of Custard the Dragon" to depict the contrasting natures of bravery and fear in the characters?

(iii) Rajvir did his study before his visit to the tea plantation. Is it good to do one's research before the start of a new venture, or does it take away from the thrill of discovery? Elucidate your stance. (Glimpses of India: Tea from Assam)

(iv) The bus ride holds a special significance for Valli in "Madam Rides the Bus." Elaborate.

(v) How does the poem "For Anne Gregory" by W.B. Yeats challenge the societal norms related to beauty and love?

9. Answer ANY TWO of the following three questions, in about 40-50 words.

(2 × 3 = 6)

(i) How does "The Thief's Story" by Ruskin Bond serve as a strong example of the impact of an unexpected friendship?

(ii) How does the role of intelligence and quick thinking transform Ausable's situation in "The Midnight Visitor"?

(iii) How does the use of irony in "A Question of Trust" add an unexpected twist to the story, enhancing the humor and keeping the reader engaged?

8. Answer ANY ONE of the following two questions, in about 100-120 words.

6

(A) You have been asked to present an evaluation of the contrasting lifestyles in 'Glimpses of India' and the humor in 'How to Tell Wild Animals'. Write this presentation draft, including your insights, in about 120-130 words, comparing these two very different pieces.

OR

(B) You have been invited to speak at a community gathering about the universal lessons that can be learned from "The Sermon at Benares" and "The Trees". Prepare a speech draft in not more than 120 words, highlighting the shared themes of change and acceptance in these two pieces.

11. Answer ANY ONE of the following two questions, in about 100-120 words.

6

(A) Imagine that Hari Singh, the thief in Ruskin Bond's "The Thief's Story," writes a diary entry after his experience with Anil. In the entry, explore how his views on trust, morality, and personal relationships have evolved. Write this diary entry, as Hari Singh, in about 120 words.

OR

(B) In "The Midnight Visitor" by Robert Arthur, how does the character of Ausable undergo development throughout the story? Discuss the changes he experiences and how these affect the unfolding of events, in about 120 words.

**Scan Me for
Handwritten
Explanations**









HOW TO USE THIS BOOK: A SIMPLIFIED GUIDE

1

Quick Revision with Cheat Sheets

Begin each subject with the Cheat sheets, linked with PYQs, for a clear understanding of key topics.

2

Practice Most Probable Questions

Focus on the Most Probable Questions that are carefully curated for exams. Practice these questions to strengthen preparation.

3

Attempt Sample Papers

Dedicate the final days to solving the Sample Papers in a timed environment. After attempting each paper, evaluate your answers against the solutions and identify areas needing improvement.

4

Follow Answer Writing Templates

Use the provided answer writing templates to organize your responses clearly and concisely. These templates are designed to help you present your answers in a structured manner to maximize your scores.

5

Learn Time Management and How to Fill OMR Sheet

Master time management by using the Time Structuring Chart provided to effectively allocate time for each section during the exam. Additionally, follow the step-by-step instructions to correctly fill the OMR sheet, ensuring accuracy and avoiding any unnecessary errors.

6

Avoid Mistakes with the 'Don't Skip' Section

Carefully go through the "Don't Skip" section to understand common pitfalls and how to avoid them. This will help you minimize errors and improve your overall exam performance.